Scripting Guide

Release 1

Tecplot, Inc. Bellevue, WA 2013

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Tecplot, Inc.
Post Office Box 52708
Bellevue, WA 98015-2708 U.S.A.
Tel:1.800.763.7005 (within the U.S. or Canada), 00 1 (425)653-1200 (internationally)
email: sales@tecplot.com, support@tecplot.com
Questions, comments or concerns regarding this document: documentation@tecplot.com
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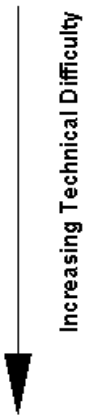
1

Introduction

Tecplot 360 is a powerful tool for visualizing a wide range of technical data. It offers line plotting, 2D and 3D surface plots in a variety of formats, and 3D volumetric visualization. The user documentation for Tecplot 360 is divided into nine books:

- Scripting Guide (this document) - Provides Macro and Python command syntax and information on working with Macro and Python files and commands.
- User's Manual - Provides a complete description of working with Tecplot 360 features.
- Getting Started Manual - New Tecplot 360 users are encouraged to work through the tutorials provided in the Getting Started Manual. The tutorials highlight working with key features in Tecplot 360.
- Quick Reference Guide - Provides syntax for zone header files, macro variables, keyboard shortcuts, and more.
- Data Format Guide - Provides information on outputting your simulator data into Tecplot 360 file format.
- Add-on Developer's Kit - User's Manual - Provides instructions and examples for creating add-ons for Tecplot 360.
- Add-on Developer's Kit - Reference Manual - Provides the syntax for the functions included in the kit.
- Installation Instructions - Provides detailed instructions on how to install Tecplot 360 on your machine.
- Release Notes - Provides information about new and/or updated Tecplot 360 features.

There are several methods available to extend or automate Tecplot 360 functionality, including: macros, scripting with Python™ and developing add-ons. Choose your method based upon your end goal and level of technical experience:



Method	General Usage	Common Use Case	Limitations
Macros	automate Tecplot 360 processes	batch processing	cannot add functionality to Tecplot 360
Python scripting	automate Tecplot 360 processes and extend capabilities	fast-fourier transforms	not all of Tecplot 360's functionality is accessible
Add-ons	extend Tecplot 360's capability	writing a new data loader	requires a compiler and development experience

Macro processing capabilities are included in your Tecplot 360 distribution. Macro language syntax and usage are provided in Scripting Guide. Macros can be accessed loaded via the **Scripting** menu and from the **Quick Macro Panel** (also accessed via the **Scripting** menu).

Your Tecplot 360 installation includes: a Python interpreter along with an interface connection, and a Python library (version 2.7.2), as well as supporting Python files. Information on working with Tecplot 360 and Python is provided in Chapter 30: "Working With Python Scripts" in the User's Manual. The syntax for the Python commands can be found using the syntax rules provided in Chapter 16: "Python Syntax Rules" along with the ADK Reference Manual.

To create add-ons for Tecplot 360, you need to have a compiler for C, C++ or FORTRAN. Refer to the ADK User's Manual for instructions for creating add-ons, along with sample add-ons.

Part 1 Tecplot 360 Macro Commands

2

Introduction to Macro Commands

A Tecplot 360 macro is a set of instructions, called macro commands, which perform actions in Tecplot 360. Macro commands can be used to accomplish virtually any task that can be done via the Tecplot 360 interface, offering an easy way to automate Tecplot 360 processes. The only things you can do interactively that cannot be done with macro commands are those actions that have no effect on a final, printed plot (such as resizing the Tecplot 360 process window). To augment this ability, there are macro commands which have no corresponding interactive control, such as looping and conditional commands. These commands typically go hand in hand with the execution of a macro.

You can create macros by recording them from the Tecplot 360 interface using the **Macro Recorder** (accessed via the **Scripting>Record Macro** menu), or create them from scratch using any ASCII text editor. In most cases, the most effective approach to creating a macro is the following hybrid approach:

1. Run Tecplot 360 and choose to record a macro to a file. Perform tasks similar to those you are trying to capture in the final macro.
2. Close the recording session and examine the macro file. The commands generated by Tecplot 360 should be fairly readable and easy to understand.
3. Make minor modifications to the recorded macro. Typical modifications involve adding loops, adding variables, or adding commands that, for example, prompt the user to enter a file name.

One of the main reasons for using the approach above is the large number of commands and permutations of parameters. This manual provides an exhaustive listing of the available macro commands. However, it is often easier to have Tecplot 360 perform the action and record the relevant command than look up individual commands and their required parameters.

An important feature of Tecplot 360's macro command language is its Viewer/Debugger. Often, you will have a well-developed macro that needs some modification. You can use the Debugger to step through the macro to the point where you want the change to be made and then start recording to a new file. Using a text editor, you can insert macro commands from a new file into an existing macro file.

3

Managing Macros

Tecplot 360 macros are stored in files. These files are processed by loading them into Tecplot 360 and running them.

3 - 1 Macros vs. Macro Functions vs. Macro Commands

A Tecplot 360 macro is a file containing one or more macro commands. These files start with the following special comment line to notify Tecplot 360 that what follows is a Tecplot 360 macro:

```
#!MC 1120
```

Any number of macro commands or comments may follow.

Tecplot 360 macro functions are defined in Tecplot 360 macros by using the `$!MACROFUNCTION-$!ENDMACROFUNCTION` commands. Between the `$!MACROFUNCTION and $!ENDMACROFUNCTION` commands you may use any valid macro command (except `$!MACROFUNCTION`). When a Tecplot 360 macro is loaded, all macro functions are extracted and the attached commands are not executed until a `$!RUNMACROFUNCTION` command is encountered.

Macro functions may be retained if desired. A retained macro function remains defined in Tecplot 360 even if the macro in which it was defined is replaced by another macro. Retained macro functions may be called by other macros that are loaded at a later time.

3 - 2 Running Macros from the Command Line

A simple way to run a Tecplot 360 macro is to include it in the command line with the `-p` flag. The following command runs Tecplot 360 and plays a macro called *a.mcr*:

```
tecplot -p a.mcr
```

If you use the *.mcr* extension for the macro file name, then the `-p` flag is optional. If you want to debug the macro, include the `-z` flag as well.

3 - 3 Running Macros from the Tecplot 360 Interface

You can run a macro file by going to **Scripting>Play Macro/Script**. A dialog appears; choose the macro to play.

If you want to debug a macro file, go to the **Scripting** menu and select the "View/Debug Macro" option. The **Macro Viewer** dialog appears so you can load in a macro. When the macro is loaded, Tecplot 360 waits at the first macro command for you to step through the commands. See Section 28 - 3 "Macro Debugging" in the User's Manual for complete details on how to use the Macro Viewer.

3 - 4 Running Macros from the Quick Macro Panel

Macros that you use frequently or want rapid access to may be defined as macro functions within a special file called *tecplot.mcr* in either the current directory, your home directory, or the Tecplot 360 home directory. When Tecplot 360 starts it looks for this file in each of those directories in turn. If Tecplot 360 finds the file, it loads the macro definitions and associates functions to buttons on the **Quick Macro Panel** dialog (in the **Scripting** menu). You can have Tecplot 360 load your own macro function file by using the `-qm` flag on the command line. The following command runs Tecplot 360 and installs the macro functions in the file *myteccmd.mcr* into the **Quick Macro Panel**:

```
tec360 -qm myteccmd.mcr
```

You can have a macro function add a button to the **Quick Macro Panel** dialog. By default, all macro functions defined in the *tecplot.mcr* file will add a button to the **Quick Macro Panel**, those defined elsewhere will not. See the $!MACROFUNCTION...$!ENDMACROFUNCTION command for more information.

If the macro file does not contain any function definitions, it will not be loaded into the **Quick Macro Panel**.

If you want Tecplot 360 to display the **Quick Macro Panel** at starting include the `-showpanel` flag on the command line.

To see an example of a macro function file, look at the file *tecplot.mcr* located in the `examples/mcr` sub-directory below the Tecplot 360 home directory. If this file is moved to the Tecplot 360 home directory, the **Quick Macro Panel** will have options that include 3D Rotation Animation and Reset Center of Rotation.

4

Writing Forward Compatible Macros

In order to ensure forward compatibility of your macro commands, please keep the following guidelines in mind. These guidelines will allow you to create macros that will work for years, on many machines and platforms.

1. **Begin your macro by opening a layout**.

   This will ensure that the final plot is consistent between versions of Tecplot 360 (even if the default style settings for Tecplot 360 have changed).

An alternative to using a layout is to load data and then paste a frame style file in each frame.

   If your macro will be used for more than one layout, you can ensure forward compatibility by:

   - Using the `$!PromptForFileName` command. This will allow the user to interactively specify the layout file.

     -or-

   - Launching Tecplot 360 from the command line, specifying the layout and the macro: *tecplot mylayout.lay mydatafile mymacro.mcr*

2. Store associated files and graphics in the same folder as the macro file.

   If your macro loads files or inserts images without allowing the user to choose them, it is a good practice to store them in the same folder as the macro file that uses them. After recording, edit the macro, and replace the path to the file with the intrinsic macro variable `|macrofilepath|`.

   Example:

   ```
   $!OpenLayout "|macrofilepath|\Density.lpk"
   ```

   This allows the macro to work without editing in any location as long as the entire folder of files was copied there.

3. Avoid using a `$!Pick` command in your macro.

Changes to the aspect ratio can cause a recorded `$!Pick` command to fail when the macro is run on another machine or in another version of Tecplot 360.

- In a plot with multiple frames, you cannot use `$!Pick` to change the active frame. Instead, give each frame a meaningful name such as “Full View” and “Zoom Frame” in the layout. Then use the command:

  ```
  $!FrameControl ActivateByName Name = “Full View”
  ```

  to access the frame you want. This will also simplify later changes to the macro.
- If you must pick an item, make the pick as precise as possible. For example, clicking on the center, not the edge, of a zone or slice will increase the chances that the pick will be successful when the macro is replayed.

  When selecting text or geometries while recording a macro, click and drag in the widest possible area around the objects to select. The command will be recorded as

  ```
  $!PICK ADDALLINRECT
   SELECTTEXT = YES
   X1 = 1.56075949367
   X2 = 3.97088607595
   Y1 = 2.29556962025
   Y2 = 3.91582278481
  ```

  The x and y ranges can be expanded if needed.

4. Use plenty of comments in your macro.

5

Debugging Macros

In general, the best way to debug a macro is to use the **Macro Viewer**, and find which command is causing the problem. Here are some tips for specific problems:

Problem: The macro was created with a previous version of Tecplot 360 to make the plot needed. With a newer version of Tecplot 360, the macro will run without error, but the plot looks different.

Solution: Run the macro with the old version of Tecplot 360, then save a frame style to a file. Begin your macro by loading the data, then pasting the frame style from a file. This will ensure that the final plot will be consistent from one version of Tecplot 360 to the next, even if the default style settings for Tecplot 360 have been changed.

Problem: The macro gives you errors such as "File does not exist" or "Cannot open file", but you can locate the file.

Solution: Copy the file to the same folder as the macro file that uses the file. Edit the macro, and replace the path to the file with the intrinsic macro variable `|macrofilepath|`.

Example: `$!Openlayout "|macrofilepath|\Density.lpk"`

This allows the macro to work without editing in any location as long as the entire folder of files was copied there.

Problem: Running the macro causes unusual error messages, such as: "No objects to cut or the objects selected not allowed to be cut" or "Not allowed to adjust zones or mappings when the mouse mode is set to SELECTOR". When you run the macro in the Macro Viewer, you see that the problem occurs with when a `$!Pick` command is run.

Solution: Avoid using a `$!Pick` command in your macro. Changes to the aspect ratio can cause a recorded `$!Pick` command to fail when the macro is run on another machine or in another version of Tecplot 360.

To fix the problem in an existing macro, follow these steps to make the coordinates more precise:

1. Run the macro on the machine where the error message is generated.

2. Via the macro viewer or editor, identify the preceding `$!PICK CHECKTOADD` or similar select type pick command. Note the X,Y coordinates of the command. A good way to do this is:
    a. Run the macro until you get the "No Objects to Shift" error message.
    b. Click Ok on the dialog.
    c. Bring up the macro viewer: **Scripting>View/Debug Macro**.
    d. Find the nearest `$!PICK CHECKTOADD` command above the current command and put a break point on that command.
    e. Press "Reset" to reset the macro and then run the macro.

If the problem only occurs when running in batch mode then try to determine the macro command by examining the *batch.log* file.

    f. Insert a `$!Pause` command in your macro just before the `$!Pick Add` command that precedes the offending command. Now run Tecplot 360 interactively from the macro viewer. You can then see the line number where you need to put the break.
3. Back in Tecplot 360, select the zoom tool.
4. Hold the shift key down and notice that the running coordinates in the lower right corner now show "PX = xxxxx PY = yyyyyy". xxxxxx and yyyyyy are the paper coordinates of the hot spot of the zoom tool. (If you see X and Y for grid coordinates, or FX and FY for frame coordinates, you need to hold down the Shift key. Pick commands always use paper coordinates.)
5. Move the zoom tool until xxxxx and yyyyy are close to the coordinates noted in step 2.
6. Note where the pick occurred. It is likely the pick occurred some distance away from the actual edge of the object to pick. Move the zoom tool to a "better" location for the pick and note the coordinates.

Edit the macro file and replace the old X,Y pick coordinates with those determined in step 6.

6

Macro Command Syntax

A macro file consists of one or more macro commands. Comments may be inserted anywhere in the file, except within a character string. Comments start with an "**#**" (octothorp) and extend to the end of the line. The first line of a macro file contains a special comment that identifies the version number of the macro file. For Tecplot 360, this line is: `#!MC 1120`.

A Tecplot 360 macro file has the form:

```
#!MC 1120
<macrocommand>
<macrocommand>
      . . .
```

Each *macrocommand*, in turn, has the form:

`$!`*commandname [commandspecificmodifiers]*
[mandatoryparameters]
[optionalparameters]

where

commandspecificmodifiers	These are optional command-specific modifiers. An example of a command that uses this is the $!FIELDMAP command. The $!FIELDMAP command can be followed by a "set." If it is not followed by a set, the $!FIELDMAP command applies to all enabled zones. A supplied set in this case is used to limit the zones to which the $!FIELDMAP command applies.
mandatoryparameters	commandparameter commandparameter...
optionalparameters	commandparameter commandparameter...
commandparameter	parameterassignment or parametersubcommand.
parameterassignment	parametername op value.
op	= or -= or += or *= or /=.
parametersubcommand	parametername {optionalparameters}.
commandname	The name of a major command, such as REDRAW.

parametername	The name of a valid parameter for the previously named major command. For example, the $!REDRAW major command has an optional parameter called DOFULLDRAWING.
value	number, expression, or enumeratedvalue.
number	Any valid integer or double value representation.
expression	Any valid infix notation expression. The entire expression must itself be enclosed in parenthesis. For example (3+5).
enumeratedvalue	A key word that is unique to the variable being assigned a value. For example, if the variable being assigned a value is a basic color then the enumerated value can be one of the following: BLACK, RED, GREEN, BLUE, CYAN, YELLOW, PURPLE, WHITE, CUSTOM1 through CUSTOM56.

Spacing and capitalization for macro commands are, for the most part, not important. The following examples show different ways to enter the same macro command to set the width and height for the custom1 paper:

Example 1:

```
$!PAGE
PAPERSIZEINFO
{
 CUSTOM1
 {
 WIDTH = 3
 }
}
```

Example 2:

```
$!PAGE PAPERSIZEINFO
{CUSTOM1
 {WIDTH = 3}
}
```

Example 3:

```
$!PAGE papersizeinfo {custom1 {width = 3}}
```

7

Macro Variables

Macro variables are identified by a sequence of characters surrounded by vertical bars (“|”). Some examples are:

```
|myvariable|
|loop|
|1|
|$HOME|
```

Macro variables can be placed anywhere within a macro command. Upper case and lower case characters are treated the same. For example `|ABC|` and `|aBc|` represent the same variable.

Macro variables will be expanded to their value at the time the macro statement is processed.

Example:

The following macro commands will result in a rotation of the data about the X-axis by 10 degrees:

```
$!VARSET |a1| = 10
$!ROTATE X
    ANGLE = |a1|
```

7 - 1 Internal Variables

The following table lists variables maintained by Tecplot 360 that may be referenced by macro commands. Since these variables are maintaned by Tecplot 360, you cannot assign values to them.

For internal variables that represent an attribute of a Tecplot 360 object of which Tecplot 360 supports multiple instances (such as a frame, a dataset, or a zone), the variable by default refers to the current or active instance: for example, to the active frame if the variable refers to an attribute of frames. If there is no obvious default instance, the variable name by itself usually refers to the first instance.

For such variables, you may specify the desired instance of the referenced type of object by enclosing an index in square brackets immediately following the variable name. For example, `|AUXZONE[3]:BC|` refers to the zone auxiliary data named `BC` in the *third* zone.

In most cases, the index may also be written as `ACTIVEOFFSET=`*n* to specify the *n*th *active* instance of an object type. For example, `|ENDSLICEPOS[ACTIVEOFFSET=2]|` refers to the end position of the *second active* slice group.

Variables	Notes
|AUXDATASET:*Auxname*|	Retrieves auxiliary data named *Auxname* from a dataset For example, |AUXDATASET:Reynolds| retrieves auxiliary data “Reynolds”.
|AUXFRAME:*Auxname*|	Retrieves auxiliary data named *Auxname* from a frame. For example, |AUXFRAME:MyFrame| retrieves auxiliary data “MyFrame” from the active frame.
|AUXZONE:*Auxname*|	Retrieves auxiliary data named *Auxname* from a specific zone. For example, |AUXZONE[3]:BC| retrieves auxiliary data "BC" from zone 3.
|AXISMAX*n*|	Maximum value of the *n*-axis range, where *n* is one of: A[a], R, X, Y or Z.
|AXISMIN*n*|	Minimum value of the *n*-axis range, where *n* is one of: A[a], R, X, Y or Z.
|BYTEORDERING|	Returns the byte ordering (INTEL or MOTOROLA).
|DATASETFNAME|	Returns the dataset file name.
|DATASETTITLE|	Returns the title of the dataset, or “No Data Set” if a dataset does not exist.
|DATE|	Returns the date in the form of *dd Mmm yyyy.*
|ENDSLICEPOS|	Returns the position of the end slice.
|EXPORTISRECORDING|	Returns YES/NO to help macros complete record commands in the proper order.
|FRAMENAME|	Returns the name of the active frame.
|INBATCHMODE|	Returns 1 if in batch mode, 0 if in interactive mode.
|ISDATASETAVAILABLE|	Returns 1 if a dataset exists, and 0 otherwise.
|ISOSURFACELEVEL|	Returns the current iso-surface’s iso-value.
|LAYOUTFNAME|	Returns the current layout file name.
|LOOP|	Innermost loop counter.
|MACROFILEPATH|	Returns the path to the directory containing the most recently opened macro file.
|MAXB|	Maximum value of the blanking variable.
|MAXC|	Maximum value of the contour variable.
|MAXI|, |MAXJ|, |MAXK|	[I, J or K]-dimension of the first active zone (2D or 3D Cartesian plots only). For finite element zones, MAXI returns the total number of nodes, MAXJ returns the total number of elements and MAXK returns the number of nodes per face (cell-based) or total number of faces (face-based).
|MAX*n*|	Maximum value of the variable assigned to the *n*-axis, where *n* is one of: A[a], R, X, Y, or Z.
|MAXS|	Maximum value of the scatter sizing variable in the active zones.
|MAXU|, |MAXV|, |MAXW|	Maximum value of the variable assigned to the [X, Y, Z]-vector component of the active zones.
|MAXVAR[*nnn*]|	Maximum value of the variable *nnn*.

Variables	Notes
|MINB|	Minimum value of the blanking variable.
|MINC|	Minimum value of the contour variable.
|MINS|	Minimum value of the scatter sizing variable for the active zones.
|MINU|, |MINV|, |MINW|	Minimum value of the variable assigned to the [X, Y, Z]-vector component for the active zones.
|MINVAR[*nnn*]|	Minimum value of the variable *nnn*.
|MIN*n*|	Minimum value of the variable assigned to the *n*-axis, where *n* is one of: A[a], R, X, Y, or Z.
|NUMFRAMES|	Number of frames.
|NUMFIELDMAPS|	Number of fieldmaps assigned to the active frame.
|NUMLINEMAPS|	Number of linemaps assigned to the active frame.
|NUMPROCESSORSUSED|	Number of processors that Tecplot 360 uses. This may differ from the total number in the machine if the $!Limits MaxAvailableProcessors configures usage differently. By default, Tecplot 360 uses all available processors in the machine.
|NUMVARS|	Number of variables in the current dataset.
|NUMZONES|	Number of zones in the current dataset.
|OPSYS|	Returns 1=UNIX/Linux/Macintosh, 2=Windows.
|PAPERHEIGHT|	The height of the paper (in inches).
|PAPERSIZE|	The size of the paper (e.g. Letter or A4).
|PAPERWIDTH|	The width of the paper (in inches).
|PLATFORMNAME|	Returns the type of platform (e.g. SGI or Windows).
|PLOTTYPE|	Returns the plot type of a frame. 0 = Sketch, 1 = XY Line, 2 = 2D, 3 = 3D, 4 = Polar Line.
|PRINTFNAME|	Returns the file name of the last file sent for printing.
|SLICEPLANETYPE|	Plane type to which slices are assigned.
|SOLUTIONTIME|	The current solution time for the specified zone, fieldmap, or linemap.
|STARTSLICEPOS|	Position of the first slice in a group.
|STREAMSTARTPOS|[*nnn*]	Indicates the starting position in X, Y, Z coordinates of streamtrace number *nnn*. For example, to indicate the starting position of the first streamtrace, use |STREAMSTARTPOS[1]|.
|STREAMTYPE|	Returns streamtrace type, such as “Surface Line” or “Surface Ribbon”.
|TECHOME|	Path to the home directory.
|TECPLOTVERSION|	The version number of the Tecplot product.
|TIME|	The current time in the form of *hh:mm:ss*.
|VARNAME|	The name of a variable specified by index.

Variables	Notes
|ZONEMESHCOLOR[*nnn*]|	Returns the color of the mesh for zone *nnn*.
|ZONENAME[*nnn*]|	Returns the name of zone *nnn*.

a. where A represents the theta (or angle) axis variable in Polar Line plots.

7 - 2 System Environment Variables

System environment variables can be accessed directly from within Tecplot 360 by preceding an environment variable name with a "$" and surrounding it with vertical bars ("|"). Using environment variables within Tecplot 360 adds another degree of flexibility to macros by taking advantage of each user's customized environment.

If an environment variable is missing, an error is generated and macro processing is terminated.

7 - 2.1 Example 1

To compare a macro variable with an environment variable:

```
$!IF |SESSION_COEFF| == |$DEFAULT_COEFF|
    # (perform some default processing here)
$!ENDIF
```

Where the `DEFAULT_COEFF` environment variable was set to some specified value of type double before starting Tecplot 360.

7 - 2.2 Example 2

To create a string from an environment variable:

User Defined Variables

```
  $!VARSET |AUTHOR| = "Author: |$LOGNAME|"
```

User-defined variables are written using the macro variable name surrounded by vertical bars ("|"). The variable name can be up to 32 characters in length. If a macro variable is defined (using the `$!VARSET` command) and it is named the same as an existing internal macro variable, then the user-defined variable takes precedence and the internal value is not effected. The internal macro variable can be recovered if you remove the user-defined variable using `$!REMOVEVAR`.

7 - 3 Assigning Values to Macro Variables

The `$!VARSET` command is used to assign a value to a macro variable. The `$!VARSET` command has the following syntax:

```
$!VARSET <macrovar> <op> <double>
```

where <*op*> can be one of =, -=, +=, *=, or /=.

Examples:

Example 1:

Add 2 to the macro variable |ABC|:

```
$!VARSET |ABC| += 2
```

Example 2:

Set |ABC| to be equal to 37:

```
$!VARSET |ABC| = 37
```

Example 3:

Multiply |ABC| by 1.5:

```
$!VARSET |ABC| *= 1.5
```

7 - 4 Assigning a String to a Macro Variable

Macro variables can be assigned to strings as well as to values. When using strings, only the "=" operator may be used.

Example:

Assign the string "myfile.plt" to the variable |FNAME|. Use |FNAME| in the $!READDATASET command:

```
 $!VARSET |FNAME| = "myfile.plt"
 $!READDATASET "|FNAME|"
```

Note that double quotes (") had to be used in the $!READDATASET command even though |FNAME| represents a string.

7 - 5 Replacement Text Use

You can assign replacement text to a macro variable. This is useful for handling cases where a macro variable may not be initialized. A macro variable with |AAAA:=XXXXX| will produce XXXXX if AAAA is not defined. This does not work with intrinsic variables.

Example:

Read in a data file assigned to the variable FNAME. If FNAME is unassigned, read in "t.dat":

```
 $!READDATASET "|FNAME:=t.dat|"
               "|FNAME:=t.dat|"
```

7 - 6 Macro Function Variables

Macro function variables are written using a number *n*, surrounded by vertical bars ("|"). The number represents the *n*th parameter from the $!RUNMACROFUNCTION command.

Examples:

Example 1:

The following commands define a macro function that uses two parameters and a command to run the macro function. The first parameter to the macro function is the amount to rotate about the X-axis and the second parameter is the amount to rotate about the Y-axis:

The command to run the macro function will cause a rotation of 10 degrees about the X-axis and 20 degrees about the Y-axis.

```
#!MC 1120
$!MACROFUNCTION NAME = "3D Rotation Animation"
$!EXPORTSETUP EXPORTFORMAT = AVI
$!EXPORTSETUP IMAGEWIDTH = 546
$!EXPORTSETUP EXPORTFNAME = "|1|AxisRotation.avi"
$!EXPORTSTART
$!LOOP |2|
 $!ROTATE3DVIEW PSI
  ANGLE = |3|
 $!REDRAW
 $!EXPORTNEXTFRAME
$!ENDLOOP
$!EXPORTFINISH
$!ENDMACROFUNCTION
$!RUNMACROFUNCTION "3D Rotation Animation" ("Theta", 6, 30)
```

Example 2:

The following commands define a macro function that opens two layout files:

```
$!MACROFUNCTION
NAME = "OL2"
$!OPENLAYOUT "|1|"
$!OPENLAYOUT "|2|"
APPEND = TRUE
$!ENDMACROFUNCTION
.
.
.
$!RUNMACROFUNCTION "OL2" ("g1.lay","g2.lay")
```

7 - 7 Using Formats in Macro Variables

When a macro variable is expanded and the macro variable is a numeric value, it is expanded using a "best float" format. It tries to make the number look as simple as possible while still retaining as much accuracy as possible. If you want the number to be formatted in a specific way then you can include C-style number formatting strings in the macro variable specification.

The syntax for including a format string is:

```
|macrovariable%formatstring|
```

The following formats are available:

- **s** - string of characters
- **d** - signed integer
- **e** - scientific notation with a lowercase "e"
- **E** - scientific notation with an uppercase "E"

- **f** - floating point
- **g** - use %e or %f, whichever is shorter
- **G** - use %E or %f, whichever is shorter
- **u** - unsigned integer, written out in decimal format
- **o** - unsigned integer, written out in octal format
- **x** - unsigned integer, written out in hexadecimal (where a - f are lowercase)
- **X**- unsigned integer, written out in hexadecimal (where A - F are uppercase)

Example 1:

Suppose you want to pause a macro and display the message "Maximum contour value is: *xxxxxx*" where *xxxxxx* only has two digits to the right of the decimal place. You would use:

```
$!Pause "Maximum contour value is: |MAXC%.2f|"
```

If |MAXC| currently has a value of 356.84206 then the dialog would show:

```
"Maximum contour value is: 356.84"
```

Example 2:

If, in the above example, you wanted to use exponential format you could use:

```
$!Pause "Maximum contour value is: |MAXC%12.6e|"
```

Here the result would be:

```
"Maximum contour value is: 3.568421e+02"
```

8

Macro Command Summary

This chapter presents a brief list of the major macro commands in Tecplot 360. All major macro commands are preceded by "$!" (dollar sign, exclamation mark).

$!ACTIVEFIELDMAPS 57

A SetValue command that changes the set of active field maps (thus changing the active zones) considered for plotting.

$!ACTIVELINEMAPS 58

A SetValue command that changes the set of line mappings considered for plotting.

$!ADDMACROPANELTITLE 58

Add a title to the **Quick Macro Panel**.

$!ALTERDATA 58

The `ALTERDATA` function operates on a data set within Tecplot 360 using FORTRAN-like equations. See Section 21 - 1 "Data Alteration through Equations" in the User's Manual for more information on using equations in Tecplot 360. The <*zonelist*> parameter specifies the set of zones on which to operate, where zonelist is a list of zones or zone ranges separated by a comma (","). Zone ranges are separated by a hyphen ("-"). If <*zonelist*> is omitted, all zones are affected. NOTE: the values for the <*zonelist*> parameter must be enclosed in square brackets. (For example, use `$!ALTERDATA [1,3]` to apply `ALTERDATA` to zones 1 and 3).

$!ANIMATECONTOURLEVELS 60

Produce an animation of a contour line plot by showing a single level at a time. The animation varies according to the currently defined contour levels and is limited by the values in the `START`, `END`, and `SKIP` parameters. To create a movie file, add `$!EXPORTSETUP` commands before this command.

$!ANIMATEIJKBLANKING 61

Produce an animation of different IJK-blankings in your plot. The animation starts at one IJK-blanking setting and marches through intermediate steps to a second setting. To create a movie file, add $!EXPORTSETUP commands before this command.

$!ANIMATEIJKPLANES 62

Produce an animation that cycles through I-, J-, or K-planes in an IJK-ordered data set. To create a movie file, add $!EXPORTSETUP commands before this command.

$!ANIMATEISOSURFACES 63

The macro command $!ANIMATEISOSURFACES produces an animation of a series of iso-surfaces beginning with the iso-surface defined by STARTVALUE and ending with the iso-surface defined by ENDVALUE. To create a movie file, add $!EXPORTSETUP commands before this command.

$!ANIMATELINEMAPS 64

Produce an animation of one Line-mapping at a time. To create a movie file, add $!EXPORTSETUP commands before this command.

$!ANIMATESLICES 65

The macro command $!ANIMATESLICES uses the currently defined start and end slice position. Use $!SLICEATTRIBUTES to set these positions; $!ANIMATESLICES then redefines how many intermediate slices are to be used, then animates a sub-set of those slices. To create a movie file, add $!EXPORTSETUP commands before this command.

$!ANIMATESTREAM 66

Produce an animation of stream markers or dashes, moving along the currently defined streamtrace paths. To create a movie file, add $!EXPORTSETUP commands before this command.

$!ANIMATETIME 66

Produce an animation of transient data. To create a movie file, add $!EXPORTSETUP commands before this command.

$!ANIMATEZONES 67

Produce an animation showing one zone at a time. To create a movie file, add $!EXPORTSETUP commands before this command. This command will not work if the active frame contains a transient data set.

$!ATTACHDATASET 68

Attach the active frame to the data set of another frame. Use PAGENUM, if the other frame is on a difference page. This command is usually found only in layout files generated by Tecplot 360. Note that the $!PLOTTYPE command automatically executes an $!ATTACHDATASET command if a frame mode is requested in a frame that does not have an attached data set. Tecplot 360 attaches the data set from the closest frame (in drawing order) having an attached data set.

$!ATTACHGEOM 69

Attach a geometry to the active frame.

$!ATTACHTEXT 71

Attach text to the active frame

$!BASICCOLOR 73

A SetValue command that sets the red, green and blue components for any of the basic colors in Tecplot 360.

$!BASICCOLORLEGEND 74

A SetValue command that allows you to create and set the style of a legend for the basic colors in Tecplot 360. The legend can be used to display any attribute of the plot represented by a basic color (for example, materials). Each frame maintains a mapping of basic colors to names. Each basic color actually used in selected layers of the plot appears in the legend unless it is excluded.

$!BASICSIZE 76

A SetValue command that sets sizes of various objects like line thicknesses, line pattern length, font height, and so forth. Sizes can be assigned when interacting with Tecplot 360 by either entering an exact value or by choosing from a preset list of values. The `$!BASICSIZE` command allows you to change the values in the preset lists.

$!BLANKING 77

A SetValue command that changes settings for IJK- or value-blanking.

$!BRANCHCONNECTIVITY 79

For zones where connectivity is shared, this command allows for branching of connectivity information from the specified zone.

$!BRANCHFIELDDATAVAR 80

Allows for branching of specified variable in the specified zone for zones that share variables.

$!BREAK 80

Jump out of the current `$!LOOP-ENDLOOP` or `$!WHILE-$!ENDWHILE`.

$!COLORMAPCONTROL [<groupnumber>] [Required-Control Option] 80

The different commands in the `COLORMAPCONTROL` compound function family are described separately in the following sections. Group number is an optional parameter ranging from 1 to 8, which defaults to 1 when omitted.

$!COLORMAPCONTROL [<groupnumber>] REDISTRIBUTECONTROLPOINTS 81

Redistribute the control points for the currently active color map so they are evenly spaced across the color map. This is equivalent to clicking Redistribute Control Points in the Color Map dialog. This does not change the RGB values assigned at each control point. Group number is an optional parameter ranging from 1 to 8, which defaults to 1 when omitted.

$!COLORMAPCONTROL [<groupnumber>] COPYSTANDARD 81

Preset either the user-defined color map or the raw user-defined color map to be a copy of one of the standard color maps. Tecplot 360 must currently be using either the user-defined color map or the raw user-defined color map in order to use this function. Group number is an optional parameter ranging from 1 to 8, which defaults to 1 when omitted.

$!COLORMAPCONTROL [<groupnumber>] RESETTOFACTORY 81

Redistribute the control points and reset the RGB values for the currently active color map. This is equivalent to clicking Reset on the Color Map dialog. Group number is an optional parameter ranging from 1 to 8, which defaults to 1 when omitted.

$!COMPATIBILITY 81

Allow datasharing access and setting, without warning.

$!CONTINUE 82

Transfer control back to nearest `$!LOOP` or `$!WHILE`.

$!CONTOURLABELS [Required-Control Option] 82

The different commands in the `CONTOURLABELS` compound function family are described separately in the following sections.

$!CONTOURLABELS ADD 82

Add contour labels to your plot.

$!CONTOURLABELS DELETEALL 83

Delete all currently defined contour labels.

$!CONTOURLEVELS [Required-Control Option] 83

The different commands in the `CONTOURLEVELS` compound function family are described separately in the following sections.

$!CONTOURLEVELS ADD 84

Add a new set of contour levels to the existing set of contour levels.

$!CONTOURLEVELS DELETENEAREST 84

Delete the contour level whose value is nearest the value supplied in the `RANGEMIN` parameter.

$!CONTOURLEVELS DELETERANGE 85

Delete all contour levels between a minimum and maximum contour value (inclusive).

$!CONTOURLEVELS NEW 85

Replace the current set of contour levels with a new set.

$!CONTOURLEVELS RESET 86

Reset the contour levels to a set of evenly distributed values spanning the entire range of the currently selected contouring variable.

$!CONTOURLEVELS RESETTONICE 86

Reset the contour levels to a set of evenly distributed, nice values spanning the entire range of the currently selected contouring variable, with a specified number of entries.

$!CREATECIRCULARZONE 87

Create a circular (or cylindrical) IJ- or IJK-ordered zone.

$!CREATEBOUNDARYZONES 87

When YES, boundary zones are created. Use this command when working with StarCCM data to preserve backward compatibility. (StarCCM Loader ONLY)

$!CREATECONTOURLINEZONES 88

Create zones from the currently-defined contour lines. One zone can be created from each contour level in that plot, or one zone for every polyline can be generated.

$!CREATEFEBOUNDARY 89

Zone edges for finite element data cannot be turned on or off using the edge plot layer in Tecplot 360. You can, however, create a separate zone which is the boundary of a finite element zone. This new zone can then be turned on or off.

$!CREATEFESURFACEFROMIORDERED 89

A FE-Surface zone can be generated from two or more I-Ordered zones. To get the best possible output, it is recommended that the source zones should have their nodes arranged in a similar manner so that the connecting lines between points are as straightforward as possible. For this reason, indices from source zones should increase in the same direction.

$!CREATEISOZONES 90

Create zones from the currently defined iso-surfaces. One zone will be created from each defined iso-surface. The iso-surfaces must be active and you must have at least one active volume zone.

$!CREATELINEMAP 90

Create a new Line-mapping.

$!CREATEMIRRORZONES 90

Create new zones that are mirror images of the source zones

$!CREATENEWFRAME 91

Creates a new frame.

$!CREATERECTANGULARZONE 91

Create a rectangular zone. If no data set exists when this command is executed, a data set is created with variables X, Y (and Z, if KMax > 1). If a data set exists prior to this command, the non-coordinate variables for the zone created are initialized to zero.

$!CREATESIMPLEZONE 92

Create a new zone by specifying only a list of XY-pairs of data. If other zones exist prior to using this function and there are more than 2 variables, then the additional variables are also created and set to zero.

$!CREATESLICEZONEFROMPLANE 93

Create a new zone as a slice through existing 3D volume zones. Use $!GLOBALTHREED to define the slicing plane orientation.

$!CREATESLICEZONES 94

Create a new zone for each slice defined on the Slice Details dialog. Only creates slices from volume zones.

$!CREATESPHERICALZONE 94

Create a spherical IJK-ordered zone.

$!CREATESTREAMZONES 95

Create one or more zones out of the currently defined streamtraces. The new zones have the same number of variables per data point as the other zones in the data set with all non-coordinate variables interpolated at the positions along the streamtrace.

$!DATASETUP 95

A SetValue command that sets miscellaneous parameters related to data.

$!DEFAULTGEOM 96

A SetValue command that sets the attributes for the default geometry. When a geometry is created interactively, its color, line thickness, and so forth, are preset based on the default geometry. This command is usually used only in the Tecplot 360 configuration file.

$!DEFAULTTEXT 97

A SetValue command that sets the attributes for the default text. When text is added to a plot interactively, its font, color, size, and so forth, are based on the default text. This command is usually used only in the Tecplot 360 configuration file.

$!DELAY 98

Delay Tecplot 360 execution for <integer> seconds.

$!DELETEAUXDATA 98

Delete Auxiliary Data in the form of name/value pairs from zones, frames or datasets.

$!DELETELINEMAPS 99

Delete one or more Line-mappings. If <set> is omitted then all Line-mappings are deleted.

$!DELETEVARS 99

Delete one or more variables.

$!DELETEZONES 99

Delete one or more zones.

$!DOUBLEBUFFER [Required-Control Option] 100

The different commands in the DOUBLEBUFFER compound function family are described separately in the following sections.

$!DOUBLEBUFFER OFF 100

Turn off double buffering; use this command once at the end of a sequence of using the double buffer.

$!DOUBLEBUFFER ON 100

Turn on double buffering; use this command once at the beginning of a sequence of using the double buffer. While double buffering is turned on all drawing is sent to the back buffer.

$!DOUBLEBUFFER SWAP 100

Swap the back buffer to the front. In other words, copy the image in the back buffer to the front.

$!DRAWGRAPHICS 101

Turn on or off all graphics drawing. Turning off all graphics during preliminary portions of a macro file can greatly increase the efficiency of the macro.

$!DROPDIALOG 101

Drop a Tecplot 360 interface dialog. This command is mainly useful for the Tecplot 360 demo. To launch a dialog use $!LAUNCHDIALOG.

$!DUPLICATELINEMAP 101

Copy attributes from an existing Line-mapping to another.

$!DUPLICATEZONE 101

Make a copy of an existing zone. You can assign index ranges to create a new zone which is a subset of the source zone.

$!ELSE 102

Conditionally handle macro commands. Used when an $!IF statement is FALSE.

$!ELSEIF 103

Conditionally handle macro commands. Used to create multiple options for statements should an $!IF statement be FALSE.

$!EXPORT 104

Export an image file from Tecplot 360. See the $!EXPORTSETUP command for details on setting up the exported image type. The `$!EXPORT` command is not valid for animation formats.

$!EXPORTCANCEL 104

Cancel out of the current export animation sequence. The animation file being generated is removed.

$!EXPORTFINISH 104

Signals the completion of an animation sequence and causes the animation file to be created. You must call `$!EXPORTSTART` prior to using `$!EXPORTFINISH`. This command is only valid for animation formats. You may use the `|EXPORTISRECORDING|` intrinsic variable to make sure that an animation sequence has been initiated.

$!EXPORTNEXTFRAME 105

Records the next frame of an animation. You must call `$!EXPORTSTART` prior to calling `$!EXPORTNEXTFRAME`. This command is only valid for animation formats. You may use the `|EXPORTISRECORDING|` intrinsic variable to make sure that an animation sequence has been initiated.)

$!EXPORTSETUP 105

A SetValue command that sets the attributes for exporting image files from Tecplot 360. Exporting is usually intended as a means to transfer images from Tecplot 360 to be imported by other applications. See $!PRINTSETUP and $!PRINT for generating output intended for printers and plotters.

$!EXPORTSTART 106

Signals the start of an animation sequence and records the first frame of the animation. This command is only valid for animation formats.

$!EXTENDEDCOMMAND 107

Send a command to an add-on. The add-on registers the name of a function that will be called when an `$!EXTENDEDCOMMAND` is processed. Tecplot 360 knows which registered function to call based on the `COMMANDPROCESSORID` string. See the function `TecUtilMacroExtCommandCallback` in the ADK Reference Manual.

$!EXTRACTFROMGEOM 107

Extract data from a 2- or 3D field plot. The locations at which to extract the data come from a polyline geometry that must be picked prior to issuing this command.

$!EXTRACTFROMPOLYLINE 108

Extract data from a 2- or 3D field plot. The locations of where to extract the data from come from a supplied polyline in the form of <xyzrawdata>.

$!FIELDLAYERS 109

A SetValue command that turns field plot layers on or off, or sets the 2D draw order.

$!FIELDMAP 109

A SetValue command that assigns zone attributes for field plots. The <set> parameter immediately following the `$!FIELDMAP` command is optional. If <set> is omitted then the assignment is applied to all zones. Otherwise the assignment is applied only to the zones specified in <set>.

$!FILECONFIG 112

A SetValue command that sets file path information in Tecplot 360.

$!FONTADJUST 115

A SetValue command that sets character spacing and sizing for fonts in Tecplot 360. These parameters rarely change.

$!FOURIERTRANSFORM 115

Performs a Fourier transform for each dependent variable for each source zone. A new zone containing the resulting frequency, amplitude, and phase variables (three for each dependent variable) is created for each source zone. If the independent variable is non-uniform, the resulting frequency is a modification of the original data (see discussion below for the INDEPENDENTVAR and OBEYSOURCEZONEBLANKING parameters). Resulting zones are assigned new time strands using the same groupings as the source zones if they belong to time stands; otherwise, the resulting zones are static.

Fourier transform result zones are named "Fourier Transform" followed by a mixture of text indicating the source zone, independent variable, and window function used. Similarly, the three variables created are given the names "Frequency", "Amplitude", and "Phase" followed by the dependent variable used. Newly-created zones are assigned passive variables for all variables that previously existed in the data set, and all previously-existing zones are assigned passive variables for all new variables created by the Fourier transform.

Perform a Fourier transform on variables 2 through 11 of zones 1 through 10 obeying source zone blanking, applying the Hann window function and excluding conjugates from the output.

$!FRAMECONTROL [Required Control Option] 116

The different commands in the `FRAMECONTROL` compound function family are described separately in the following sections. When working with the `FRAMECONTROL` commands, it may help to realize that a command containing "Activate" changes the active frame; a command containing "MoveTo" changes the frame drawing order.

$!FRAMECONTROL ACTIVATETOP 117

Changes the active frame to the frame that is topmost in the frame drawing order.

$!FRAMECONTROL ACTIVATENEXT 117

Changes the active frame to the next one up in the frame drawing order, or to the bottom frame if the active frame is at the top.

$!FRAMECONTROL ACTIVATEPREVIOUS 117

Changes the active frame to the next one down in the frame drawing order, or to the top frame if the active frame is at the bottom.

$!FRAMECONTROL ACTIVATEATPOSITION 117

Activates the topmost frame at the specified position. X and Y are in paper coordinates.

$!FRAMECONTROL ACTIVATEBYNAME 118

Changes the active frame to the specified frame. If no frame name is given, this will activate the bottom frame.

$!FRAMECONTROL ACTIVATEBYNUMBER 118

Changes the active frame to the specified frame.

$!FRAMECONTROL MOVETOTOPACTIVE 118

Moves the active frame to the top of the drawing order.

$!FRAMECONTROL MOVETOTOPBYNAME 119

Moves the frame specified by name to the top of the frame drawing order.

$!FRAMECONTROL MOVETOTOPBYNUMBER 119

Moves the frame specified by number to the top of the frame drawing order. If no frame number is specified, this command will move the bottom frame to the top of the frame drawing order.

$!FRAMECONTROL MOVETOBOTTOMACTIVE 119

Moves the active frame to the top of the frame drawing order.

$!FRAMECONTROL MOVETOBOTTOMBYNAME 119

Moves the frame specified by name to the bottom of the frame drawing order.

$!FRAMECONTROL MOVETOBOTTOMBYNUMBER 120

Moves the frame specified by number to the bottom of the frame drawing order.

$!FRAMECONTROL DELETEACTIVE 120

Delete the active frame.

$!FRAMECONTROL FITALLTOPAPER 120

Resize all frames so that they fit inside the hardclip limits of the paper.

$!FRAMELAYOUT 120

A SetValue command that sets the position, border, and background attributes for the active frame. Use the `$!FRAMECONTROL` action command to push and pop frames if you want to change the settings for a frame other than the active frame.

$!FRAMENAME 121

Set the name for the active frame (Default = "Frame001").

$!FRAMESETUP 121

A SetValue command that sets parameters used to preset dynamic frame attributes when a frame is initialized.

$!GETAUXDATA 123

Retrieve Auxiliary Data in the form of name/value pairs and save it to the macro variable.

$!GETCONNECTIVITYREFCOUNT 123

Fetch the count of how many zones share connectivity with the specified zone. Count includes specified zone.

$!GETCURFRAMENAME 124

Query Tecplot 360 for the name of the active frame. The <macrovar> represents the macro variable to receive the results.

$!GETFIELDVALUE 124

Fetch the field value (data set value) at the specified point index and assign the value to <macrovar>. If the zone referenced is IJ- or IJK-ordered, then the point index is calculated by treating the 2- or 3Dimensional array as a 1-D array.

$!GETFIELDVALUEREFCOUNT 124

Get the count of how many zones share the indicated variable with the specified zone. Count includes the specified zone.

$!GETNODEINDEX 125

This function only works for finite-element zones. Query for the node index in the specified location as described by the `ZONE, ELEMENT,` and `CORNER` parameters.

$!GETVARLOCATION 126

Returns the location of the variable in the zone as either CELLCENTERED or NODAL and saves in the macro variable.

$!GETVARNUMBYNAME 126

Given a variable name, get the number for that variable. This variable number can then be used to assign attributes, such as what variable to use for contouring.

$!GETZONETYPE 126

Query for the zone type of the specified zone. The zone type will be assigned to <macrovar>.

$!GLOBALCOLORMAP 127

A SetValue command that changes the settings for the global contour color map and the global light source shading color map in Tecplot 360. Changes here affect all frames using these color maps. See $!GLOBALCONTOUR COLORMAPFILTER for additional settings that can be applied on a frame-by-frame basis.

$!GLOBALCONTOUR 128

A SetValue command that changes global attributes associated with contour plots or contour levels. The optional parameter <contourgroup> refers to the defined contour groups, 1-8, allowed in Tecplot 360, and takes an integer value of one through eight. The <contourgroup> parameter is optional, and if omitted, Tecplot 360 will use contour group 1. If you would like the settings in these commands to persist, add them to your *tecplot.cfg file*, located in your installation directory. The `NUMBERFORMAT` setting for `LABELS` also controls the number format in the legend.

$!GLOBALEDGE 131

A SetValue command that sets attributes which sets the minimum crease angle for edges.

$!GLOBALFRAME 131

A SetValue command that sets attributes which apply to all frames. If you would like the settings in this command to persist, add it to your tecplot.cfg file, located in your installation directory.

$!GLOBALLINEPLOT 132

A SetValue command that changes global attributes associated with Line-plots. If you would like the settings in these commands to persist, add it to your *tecplot.cfg* file, located in your installation directory.

$!GLOBALLINKING 133

Set to YES to tie all colormaps together. If you would like the settings in this command to persist, add it to your tecplot.cfg file, located in your installation directory.

$!GLOBALPAPER 133

A SetValue command that sets the paper size characteristics. If you would like the settings in this command to persist, add it to your tecplot.cfg file, located in your installation directory.

$!GLOBALPOLAR 134

Allows polar plots to have curved lines that are interpolated along the R-Axis between data points.

$!GLOBALRGB 135

Allows RGB coloring for plots which have RGB values specified at each vertex. This coloring option is valuable for plots with entities such as Gas, Oil and Water. RGB Coloring can be assigned to field plot objects such as zones, iso-surfaces and slices

$!GLOBALSCATTER 136

A SetValue command that changes global attributes associated with scatter plots.

$!GLOBALTHREED 138

A SetValue command that changes global attributes associated with 3D plots.

$!GLOBALTHREEDVECTOR 139

A SetValue command that changes global attributes associated with 3D vector plots.

$!GLOBALTIME 140

A SetValue command for frames (2D and 3D ONLY). Different frames can have different values of `$!GLOBALTIME`. If you would like the settings in this command to persist, add them to your *tecplot.cfg* file (located in your installation directory).

$!GLOBALTWODVECTOR 141

A SetValue command that changes global attributes associated with 2D vector plots.

$!IF...$!ENDIF 142

Conditionally process macro commands.

$!INCLUDEMACRO 142

Insert the commands from another macro file. Because the `$!INCLUDEMACRO` command is processed when the macro is loaded and not when the macro is executed, you are not allowed to reference macro variables within the <string> parameter.

$!INTERFACE 142

A SetValue command that sets attributes related to the Tecplot 360 interface.

$!INVERSEDISTINTERPOLATE 151

Interpolate selected variables from one or more zones onto a destination zone using the inverse distance method.

$!ISOSURFACEATTRIBUTES 152

A SetValue command which changes attributes associated with iso-surfaces.The optional group parameter can range from 1-8 and defaults to 1 when absent.

$!ISOSURFACELAYERS 154

Turn iso-surfaces on or off.

$!KRIG 154

Interpolate selected variables from a set of source zones to a destination zone using the kriging method.

$!LAUNCHDIALOG 155

Launch a Tecplot 360 interface dialog; This command is mainly useful for the Tecplot 360 demo.

$!LIMITS 155

A SetValue command that sets some of the internal limits in Tecplot 360. See Chapter F: "Limits of Tecplot Focus" in the User's Manual for additional information. The `$!LIMITS` command can only be used in the Tecplot 360 configuration file.

$!LINEARINTERPOLATE 156

Interpolate selected variables from a set of source zones to a destination zone using linear interpolation. The source zones cannot be I-ordered. Values assigned to the destination zone are equivalent to the results of using the probe tool in Tecplot 360.

$!LINEMAP 157

A SetValue command that assigns attributes for individual Line-mappings. The <set> parameter immediately following the `$!LINEMAP` command is optional. If <set> is omitted then the assignment is applied to all Line-mappings, otherwise the assignment is applied only to the Line-mappings specified in <set>.

$!LINEPLOTLAYERS 160

A SetValue command that turns on or off Line-plot layers.

$!LINKING 160

Link attributes in two or more frames so that changes to attributes of one frame effect all linked frames.

$!LOADADDON 161

Load an add-on into Tecplot 360. The <string> is the name of the add-on to load. See Section 33 - 1 "Add-on Loading" in the User's Manual for instructions on how to specify the add-on.

$!LOADCOLORMAP 162

Load a color map file. The <string> is the name of the file to load.

$!LOOP...$!ENDLOOP 162

Process macro commands in a loop. Within the loop you may access the current loop counter using the internal macro variable `|Loop|`. Loops may be nested up to 10 levels deep.

$!MACROFUNCTION...$!ENDMACROFUNCTION 162

Define a macro function. All commands between a `$!MACROFUNCTION` and the `$!ENDMACROFUNCTION` are associated with the macro function `NAME`. These commands are not executed when they are defined but are executed when a `$!RUNMACROFUNCTION` command is processed. Parameters can be passed to a macro function. Use |*n*| to reference the *n*th parameter. (See $!RUNMACROFUNCTION). In the user-interface, [Crtl]-M must be pressed, before using the keyboard shortcut specified by the `KEYSTROKE` option. For example, if the `KEYSTROKE` option is set to "P", the user must press [CTRL]-M-P.

$!NEWLAYOUT 163

Clear the current layout and start again.

$!OPENLAYOUT 163

Open and read in a new layout file. The <string> is the name of the file to open.

$!PAGE 164

A SetValue command that sets the paper characteristics.

$!PAGECONTROL [Required-Control Option] 165

The different commands in the `PAGECONTROL` compound function family are described separately in the following sections.

$!PAGECONTROL CREATE 166

Create a new page. The created page will include an initial frame.

$!PAGECONTROL SETCURRENTTONEXT 166

Set the next page to be the current page.

$!PAGECONTROL SETCURRENTTOPREVIOUS 166

Set the previous page to be the current page.

$!PAGECONTROL SETCURRENTBYNAME 166

Set the current page to the page specified.

$!PAGECONTROL DELETE 166

Delete the current page. If the command is operated on the only page, then an initial page is created with an initial frame.

$!PAGECONTROL CLEAR 166

Clears all frames in the current page and creates a default initial frame.

$!PAGEGETNAME 167

Action command to get the name of the current page.

$!PAGENAME 167

Set the name of the page.

$!PAUSE 167

Stop execution of a macro and optionally display a dialog with a message. If <string> is set to "" then no dialog is displayed and the user must click in the work area to continue.

Pause and display the message `This is the first example plot`:

$!PICK [Required-Control Option] 167

The different commands in the `PICK` compound function family are described separately in the following sections.

$!PICK ADDATPOSITION 167

Attempt to pick an object at a specific location on the paper. Does not pop or activate frames.

$!PICK ADDALL 168

Add all objects of a certain type to the list of picked objects.

$!PICK ADDALLINRECT 168

Add objects defined within a specified region to the list of picked objects. The region is defined in terms of the paper coordinate system. Optional filters can be used to restrict the objects selected. The region is defined by the two corner points (X1, Y1) and (X2, Y2).

$!PICK CLEAR 170

Delete all objects that are currently picked. (These objects cannot be retrieved.)

$!PICK COPY 170

Copy all objects that are currently picked to the paste buffer.

$!PICK CUT 170

Copy all objects that are currently picked to the paste buffer and then delete them.

$!PICK EDIT 170

Perform a global edit operation on the currently picked objects. Only one edit operation is allowed per `$!PICK EDIT` command. Objects are edited only if the supplied parameter is relevant. Actions taken using the **Quick Edit** dialog in Tecplot 360 generate these commands.

$!PICK MAGNIFY 172

Magnify all picked objects. The objects will also be translated proportional to the distance between their anchor position and the anchor position of the first object picked.

$!PICK PASTE 173

Paste the currently picked objects from the paste buffer to the work area.

$!PICK POP 173

Change the order in which objects are drawn by popping the currently picked objects to the front. Only frames, text, geometries, and the grid area for 2D plots are allowed.

$!PICK PUSH 173

Change the order in which objects are drawn by pushing the currently picked objects back. Only frames, text, geometries, and the grid area for 2D plots are allowed.

$!PICK SETMOUSEMODE 173

Prepare to pick objects by setting the mouse mode to `SELECT`, `ADJUST`, or `ADVANCEADJUST`. `ADVANCEADJUST` is a combination of `SELECT` and `ADJUST` that allows an object's control points to be adjusted by dragging, or the entire object to be selected by clicking away from the control points. This command also clears the list of picked objects (that is, unpicks all picked objects).

$!PICK SHIFT 174

Shift the currently picked objects. Objects are shifted relative to their starting position. X and Y shift amounts are in paper units (inches). If snapping is in effect then it is applied after shifting in X and Y. (See the SetValue commands $!GLOBALFRAME SNAPTOGRID and $!GLOBALFRAME SNAPTOPAPER.)

$!PLOTOPTIONS 174

Change the plot option between subdividing all cells, or using a quicker algorithm.

$!PLOTTYPE 174

Changes plot types between valid Tecplot 360 modes such as XYLine and Cartesian2D. Valid options shown below.

$!POLARAXIS 175

A SetValue command that assigns attributes for axes in a polar frame.

$!POLARTORECTANGULAR 175

Treat the variables currently assigned to X and Y as referring to R and q and convert them to X and Y. In 3D, X, Y and Z refer to R, q, and y. Tecplot 360 has addition capabilities for transforming coordinates, please see $!TRANSFORMCOORDINATES.

$!POLARVIEW 176

Sets the viewing style for polar plots in a layout.

$!PRINT 176

Print the current layout to a printer or send the print instructions to a file. Use the `$!PRINTSETUP` SetValue command to configure printing.

$!PRINTSETUP 176

A SetValue command that sets the attributes for printing. Use `$!PRINT` to do the actual printing. See $!EXPORTSETUP and $!EXPORT if you intend to create image files destined for desktop publishing programs.

$!PROMPTFORFILENAME 178

Instruct Tecplot 360 to launch a file selection dialog. The resulting file name will be placed in <macrovar>. If the user cancels out of the dialog then <macrovar> will be empty (see the example below).

$!PROMPTFORTEXTSTRING 178

Instruct Tecplot 360 to launch a dialog containing a single line text field and optional instructions. The user enters text into the text field and the resulting string is assigned to <macrovar>.

$!PROMPTFORYESNO 179

Instruct Tecplot 360 to launch a dialog containing two buttons, one labeled Yes and the other No. The <macrovar> is assigned the string Yes or No depending on the selection.

$!PROPAGATELINKING 179

Link multiple frames, either within frame or between frames.

$!PUBLISH 179

Create an HTML file displaying one or more images. A linked layout with packaged data may be included. You must provide the file name.

$!QUIT 180

Terminate the execution of the Tecplot 360 program.

$!RAWCOLORMAP 180

Assign the RGB values that define the Raw user-defined color map. This does not set the color map to use the Raw user-defined color map. Use `$!COLORMAP` to set the current color map.

$!READDATASET 181

The $!READDATASET macro command has two separate uses. The parameters available for the command are dependent upon the intended use. It may either be used to load data in Tecplot 360's file format (*.*plt* or *.*dat*) or in a foreign data file format. To load data in Tecplot 360's file format, use the parameters listed in Table 9 - 2. To load data in a foreign file format, use the parameters listed in Table 9 - 1 along with a set of name/value pairs. The name/value pairs are specific to the data loader and described in Chapter 4: "Data Loaders" in the User's Manual.

$!READSTYLESHEET 183

Read in a stylesheet file. The <string> is the name of the file to read.

$!REDRAW 183

Redraw the active frame.

$!REDRAWALL 184

Redraw all frames.

$!REMOVEVAR 184

Remove a user-defined macro variable. This frees up space so another user-defined macro variable can be defined.

$!RENAMEDATASETVAR 184

Rename a data set variable in Tecplot 360.

$!RENAMEDATASETZONE 185

Rename a data set zone in Tecplot 360.

$!RESET3DAXES 185

Reset the ranges on the 3D axes.

$!RESET3DORIGIN 185

Reposition the rotation origin in 3D to be at the specified location.

$!RESET3DSCALEFACTORS 186

Recalculate the scale factors for the 3D axes. Aspect ratio limits are taken into account.

$!RESETVECTORLENGTH 186

Reset the length of the vectors. Tecplot 360 will find the vector with the largest magnitude and set the scaling factor so it will appear on the screen using the length specified by `$!FRAMESETUP VECTDEFLEN`.

$!ROTATE2DDATA 186

Rotate field data in 2D about any point.

$!ROTATE3DVIEW 187

Do a 3D rotation about a given axis. The <rotateaxis> must be supplied.

$!RUNMACROFUNCTION 187

Execute commands defined in a macro function. The <string> references the name of the macro function to run. If the macro command requires parameters, then include them (within parentheses) after the macro command name.

$!SAVELAYOUT 188

Save the current layout to a file. You must supply the file name.

$!SET3DEYEDISTANCE 188

Sets the distance from the viewer to the plane of the current center of rotation.

$!SETAUXDATA 188

Add Auxiliary Data in the form of name/value pairs to zones, frames or datasets. The name must begin with an underscore or letter, and may be followed by one or more underscore, period, letter, or digit characters.

$!SETDATASETTITLE 189

Set the title for the current data set.

$!SETFIELDVALUE 189

Specify a field value (data set value) at a specified point index. If the zone referenced is IJ- or IJK-ordered then the point index is calculated by treating the 2- or 3D array as a 1-D array.

Note that the `INDEX` value was calculated using:

$!SETFRAMEBACKGROUNDCOLOR 190

Sets the frame background to the specified color and surveys all basic color assignments in Tecplot 360, converting the all basic colors using the following rules to achieve the best contrast:

$!SETSTYLEBASE 190

Instruct Tecplot 360 on how to initialize frame style values when a new frame is created. During normal operation, Tecplot 360 bases the style of a new frame on the factory defaults plus any changes assigned in the Tecplot 360 configuration file. Layout files and stylesheet files, however, rely on Tecplot 360 basing new frames only on the factory defaults. This command is typically not used by the casual user.

$!SHARECONNECTIVITY 191

Share the nodemap between the source and destination zones, presuming that the zones are FE and have the same element type and number of nodes.

$!SHAREFIELDDATAVAR 191

Allows sharing of the specified variable from the source zone to the destination zone. Zone must be of the same type (ordered or FE) and dimensions. Cell centered variables in FE must have the same number of cells. Sharing is not allowed if either zone has global face neighbors.

$!SHIFTLINEMAPSTOBOTTOM 192

Shift a list of Line-mappings to the bottom of the Line-mapping list. This in effect causes the selected Line-mappings to be drawn last.

$!SHIFTLINEMAPSTOTOP 192

Shift a list of Line-maps to the top of the Line-map list. This in effect causes the selected Line-maps to be drawn first.

$!SHOWMOUSEPOINTER 192

The mouse icon may be deactivated within a macro to enhance the on-screen animation. It must be reactivated before exiting the macro.

$!SKETCHAXIS 192

A SetValue command that assigns attributes for axes in a sketch mode frame. Axes are rarely used in sketch frames.

$!SLICEATTRIBUTES 193

A SetValue command that changes global attributes associated with slices.

$!SLICELAYERS 196

Turn slicing on or off.

$!SMOOTH 197

Smooth data (reduce the spikes) for selected variables in selected zones.

$!STREAMATTRIBUTES 197

A SetValue command that changes global attributes associated with streamtraces.

$!STREAMTRACE [Required-Control Option] 199

The different commands in the STREAMTRACE compound function family are described separately in the following sections.

$!STREAMTRACE ADD 199

Add a single streamtrace or a rake of streamtraces to the active frame. The frame must be a 2D or 3D field plot.

$!STREAMTRACE DELETEALL 201

Deletes all streamtraces in the active frame. If the frame mode is 2D, all 2D streamtraces are deleted. If the frame mode is 3D, all 3D streamtraces are deleted.

$!STREAMTRACE DELETERANGE 201

Delete a range of streamtraces. Streamtraces are numbered sequentially in the order they were created.

$!STREAMTRACE RESETDELTATIME 201

Reset the time delta for dashed streamtraces. The delta time is reset such that a stream dash in the vicinity of the maximum vector magnitude will have a length approximately equal to 10 percent of the frame width.

$!STREAMTRACE SETTERMINATIONLINE 202

Set the position of the termination line for streamtraces.

$!STREAMTRACELAYERS 202

Turn streamtraces on or off.

$!SYSTEM 202

Instruct Tecplot 360 to submit a command to the operating system. For security reasons, execution of the `$!SYSTEM` command can be disabled to prevent unauthorized execution of system commands via macros. Use the `OKTOEXECUTESYSTEMCOMMAND` option to the `$!INTERFACE` macro command.

$!THREEDAXIS 203

A SetValue command that assigns attributes for axes in a 3D frame.

$!THREEDVIEW 204

A SetValue command that changes global attributes associated with the 3D view.

$!TRANSFORMCOORDINATES 205

Transforms all points in one or more zones from one coordinate system to another.

$!TRIANGULATE 206

Create a new zone by forming triangles from data points in existing zones.

$!TWODAXIS 207

A SetValue command that assigns attributes for axes in a 2D frame.

$!VARSET 208

Assign a value to a macro variable. If the macro variable did not exist prior to this command, then it is defined here. A macro variable can be assigned a value or a string.

$!VIEW [Required-Control Option] 208

The different commands in the `VIEW` compound function family are described separately in the following sections.

$!VIEW AXISFIT 209

Reset the range on a specific axis so that it equals the minimum and maximum of the data being plotted. If the axis dependency is not independent then this action may also affect the range on another axis.

$!VIEW AXISMAKECURRENTAXISVALUESNICE 209

Reset the axis-line label values such that all currently displayed values are set to have the smallest number of significant digits possible.

$!VIEW AXISNICEFIT 209

Reset the range on a specific axis so that it equals the minimum and maximum of the data being plotted, but makes the axis values “nice” by setting labels to have the smallest number of significant digits possible. If the axis dependency is not independent then this action may also affect the range on another axis.

$!VIEW CENTER 210

Center the data within the axis grid area.

$!VIEW COPY 210

Copy the current view to the view paste buffer. See also $!VIEW PASTE.

$!VIEW DATAFIT 210

Fit the current set of data zones or line mappings being plotted within the grid area. This does not take into consideration text or geometries.

$!VIEW FIT 210

Fit the entire plot to the grid area. This also takes into consideration text and geometries that are plotted using the grid coordinate system. In 3D, this also includes the axes.

$!VIEW FITSURFACES 211

Fits active plot surfaces to the grid area. 3D volume zones are excluded when surfaces to plot are set to none. See $!FIELDMAP for more information on setting surfaces to plot.

$!VIEW LAST 211

Retrieve the previous view from the view stack. Each frame mode within each frame maintains its own view stack. `$!VIEW LAST` will not reverse alterations to data.

$!VIEW MAKECURRENTVIEWNICE 211

Shifts axis to make axis-line values nice without changing the extents of the window. Only works in Sketch/XY/2D.

$!VIEW NICEFIT 211

Change view to make the extents of the frame neatly hold the plot with integer values for axis labels. Only works in Sketch/XY/2D.

$!VIEW PASTE 211

Retrieve the view from the view paste buffer and assign it to the active frame.

$!VIEW PUSH 211

Instruct Tecplot 360 to push the current view onto the view stack. A view will not be pushed if the current view is the same as the top view on the stack. Note that commands `VIEW AXISFIT`, `VIEW CENTER`, `VIEW DATAFIT`, `VIEW FIT`, and `VIEW ZOOM` automatically push a view onto the stack. Tecplot 360 automatically pushes the current view onto the stack when a `$!REDRAW` command is issued and the current view is different from the top view on the view stack.

$!VIEW RESETTOENTIRECIRCLE 212

Reset the Theta-R Axis to initial settings. For Polar plots only.

$!VIEW SETMAGNIFICATION 212

Set the magnification for the data being plotted. A magnification of 1 will size the plot so it can fit within the grid area.

$!VIEW TRANSLATE 212

Shift the data being plotted in the X- and/or Y-direction. The amount translated is in frame units.

$!VIEW ZOOM 212

Change the view by "zooming" into the data. In Sketch, XY, and 2D frame mode plots, Tecplot 360 will adjust the ranges on the axis to view the region defined by the rectangle with corners at (X1, Y1) and (X2, Y2). For 3D orthographic plots, the view is translated and scaled to fit the region. For 3D perspective plots, the view is rotated about the viewer and scaled to fit the region. X1 and so forth are measured in grid coordinates.

$!WHILE...$!ENDWHILE 213

Continue to execute a set of commands until a conditional expression is NO.

$!WORKSPACEVIEW [Required-Control Option] 213

The different commands in the `WORKSPACEVIEW` compound function family are described separately in the following sections.

$!WORKSPACEVIEW FITALLFRAMES 214

Change the view in the workspace so all frames are fit just inside the edges of the workspace.

$!WORKSPACEVIEW FITPAPER 214

Change the view in the workspace so the entire paper is fit just inside the edges of the workspace.

$!WORKSPACEVIEW FITSELECTEDFRAMES 214

Change the view in the workspace so the currently selected frames (that is, the frames with pick handles) are fit just inside the edges of the workspace.

$!WORKSPACEVIEW LASTVIEW 214

Return to the previous workspace view.

$!WORKSPACEVIEW MAXIMIZE 214

Temporarily expand the work area as large as possible. The maximized work area occupies the entire Tecplot 360 process window.

$!WORKSPACEVIEW TRANSLATE 214

Shift the view of the workspace. This has no effect on the local view within any frame in your layout.

$!WORKSPACEVIEW UNMAXIMIZE 215

Returns the workspace to its normal size after it has been expanded after `$!WORKSPACE MAXIMIZE` has been used.

$!WORKSPACEVIEW ZOOM 215

Change the view into the work area. This has no effect on the local view within any frame in your layout.

$!WRITECOLORMAP 216

Write the current color map to a file. The <string> is the name of the file to write to.

$!WRITECURVEINFO 216

Write out the curve details or the calculated data points for the equation(s) used to draw the curve for a selected line mapping. The <string> is the name of the file to write to.

$!WRITEDATASET 216

Write the data set attached to the active frame to a file. The <string> is the name of the file to write to.

$!WRITESTYLESHEET 217

Write the style for the active frame to a file. The <string> is the name of the file to write to.

$!XYLINEAXIS 218

A SetValue command that assigns attributes for axes in an XY Line plot.

Set the axis mode to be independent for the XY-axes (note that this affects only X1 versus Y1):

ANIMATESTREAKLINES 220

Animates previously calculated streaklines to the screen or to a file.

ATTACHINTEGRATIONRESULTS 221

Attach the text results of the previous integration as a text field in the active frame.

CALCPARTICLEPATH 221

Calculate particle paths or streaklines, starting from existing Tecplot 360 streamtraces.

CALCTURBULENCEFUNCTION 224

Calculate a turbulence-related function from two variables in the current data set. Add the result to the data set as a new variable using the function's name, or overwrite the variable if it already exists.

CALCULATE 224

Calculate a Tecplot 360 variable using the specified function and add it to the current data set. If the variable already exists in the current data set, it will be recalculated.

CALCULATEACCURACY 225

Calculate the order accuracy of the solution contained in the listed zones. Optionally, plot the overall accuracy versus grid spacing and plot the accuracy at each grid node.

DISPLAYBOUNDARIES 226

Displays boundaries corresponding to a geometry and boundaries specification without actually setting the geometry and boundaries. This macro is generally not useful for those writing macro files, but is recorded when the user clicks the Display Boundaries button in the Geometry and Boundaries dialog in order to duplicate the actions of Tecplot 360 that happen in response to that action. See Section "SETGEOMETRYANDBOUNDARIES" on page 232 for a description of the parameters for this macro.

EXTRACTFLOWFEATURE 226

Extract and display shock surfaces, vortex cores, or separation and attachment lines. Shock surfaces are displayed as iso-surfaces of a new variable, ShockSurface, while vortex cores and separation and attachment lines are displayed as new zones.

EXTRAPOLATESOLUTION 227

Perform Richardson extrapolation to estimate the true solution from three input solutions on grids of successively finer resolution. Two new zones are added to the current data set. The first contains the extrapolated solution, while the second contains the estimated error.

INTEGRATE 227

Perform an integration over the specified zones (or time strands, if INTEGRATEBY is set to TIMESTRANDS). If <set> is not specified, the integration will be performed over all zones (or time strands). If `PLOTAS` is set to `TRUE`, the integration results will be plotted in a new frame.

SAVEINTEGRATIONRESULTS 229

Saves the most recently calculated integration results to a text file.

SETFIELDVARIABLES 230

Identifies variables in your data, such as velocity, pressure and temperature, for use in analysis.

SETFLUIDPROPERTIES 230

Set the fluid properties for use by other commands.

SETGEOMETRYANDBOUNDARIES 232

Specify whether the data represent an axisymmetric flow solution (2D Cartesian plots only), whether adjacent zones should be considered to be connected at coincident faces, and specify zone boundaries and their corresponding boundary conditions. Each line of the `RAWDATA` describes one boundary, and appears in the same format as on the Geometry and Boundaries dialog. For all boundaries, list the boundary condition and the set of zones, separated by a comma. The index range-type boundary follows this with the boundary face, the first starting index, the first ending index, the second starting index and the second ending index. All entries are separated by commas. The boundary condition is one of `INFLOW`, `OUTFLOW`, `WALL`, `SLIPWALL`, `SYMMETRY`, `EXTRAPOLATED`. The boundary face is one of `I=1`, `I=IMAX`, `J=1`, `J=JMAX`, `K=1`, and `K=KMAX`. Refer to Section 22 - 4 "Setting Geometry and Boundary Options" in the User's Manual for more information on boundaries.

SETREFERENCEVALUES 232

Specify the reference (free-stream) properties of the solution, identify two variables in the current data set for use with other commands.

SETUNSTEADYFLOWOPTIONS 233

Identifies time levels for unsteady flow, or specifies that the solution is steady-state. If the flow is unsteady, the solution time levels are specified in the `RAWDATA` section. The first line of the `RAWDATA` section must consist of a single integer indicating the number of solution time levels. This must be followed by the time levels themselves. Each time level must be on a separate line and must consist of a floating-point number (the solution time), as well as one or more integers (the zone numbers for that solution time).

<<anchorpos>> 235

Assign attributes for positioning of objects.

<<areastyle>> 236

Change settings for the axis grid area.

<<axisdetail>> 236

Assign attributes for axes.

<<axisline>> 237

Assign attributes for axis lines.

<<axistitle>> 238

Assign attributes for titles.

<<basiccolorcontrol>> 239

Assign name to a basic color .

<<basicsizelist>> 239

Assign basic sizes. The units for the values assigned here are dependent on the parent command. Assignments here do not affect the plot. These assignments are used only to configure drop-down menus in the interface so the user can make quick selections.

<<colormapcontrolpoints>> 240

All contour color maps except the Raw user-defined color map make use of control points to determine the color distribution. Each control point has a position and a left and right color. The *<<colormapcontrolpoints>>* subcommand can contain more than one `CONTROLPOINT` subcommand.

<<colormapoverride>> 240

Change settings for a color map override. Color map overrides are used to replace a specific band in a contour color map with one of the 16 basic colors.

<<continuouscolor>> 241

Change settings for continuous color.

<<dialogplacement>> 242

Describes the placement for a dialog.

<<gridarea>> 242

Change settings for the axis grid area.

<<gridlinedetail>> 243

Change settings for axis gridlines.

<<ijk>> 244

Set an I-, J-, or K-index.

<<indexrange>> 244

Set an index range.

<<numberformat>> 245

Set the format used to draw a number.

<<papersize>> 246

Change dimensions or hardclip offsets for `LETTER, DOUBLE, A3, A4, CUSTOM1` and `CUSTOM2` paper sizes.

<<precisegrid>> 246

Change settings for the precise dot grid.

<<rect>> 246

Change settings for a rectangle. The rectangle is defined using two points (X1,Y1) and (X2,Y2).

<<refscatsymbol>> 247

Set the attributes for the reference scatter symbol.

<<renderconfig>> 248

Set the attributes for OpenGL rendering.

<<rgb>> 249

Set a color value by assigning values to its red, green, and blue components.

<<shademap>> 249

Map colors on the screen to shades of gray for monochrome hardcopy output.

<<symbolshape>> 250

Set a symbol shape. Symbols can be a geometric shape (circle, square, and so forth) or an ASCII character.

<<textbox>> 251

Change settings for the optional box around a text label.

<<textshape>> 251

Change settings related to text font and character height.

<<ticklabeldetail>> 252

Change settings for the text used to label axis tick marks.

<<tickmarkdetail>> 253

Assign attributes for axis tick marks.

<<volumeobjectstoplot>> 254

Specifies what volume objects are to be displayed.

<<xy>> 255

Change settings for an (X,Y) position.

<<xyz>> 255

Change settings for an (X, Y, Z) triplet.

<<zebrashade>> 255

Change zebra shading attributes.

LOADPYFILE NAME 290

Use this function to load a Python module via a macro file.

MODIFYPYPATH 290

Use this command to temporarily modify your PYTHONPATH variable. The variable will be set for the duration of the Tecplot 360 session using the macro command/file.

RUNPYFUNCTION 291

Use this command to execute a Python function via a macro file. NOTE: Before executing a Python function, you must first load the module that contains it via the LOADPYFILE NAME command.

9

Macro Commands

This chapter lists Tecplot 360's macro commands alphabetically. Optional parameters are enclosed within square brackets ([ ]). Items within double angle brackets (<< >>) represent parameter sub-commands listed and described in Chapter 11: "Parameter Subcommands".

A

$!ACTIVEFIELDMAPS

Syntax: `$!ACTIVEFIELDMAPS <op> <set>`
`[no optional parameters]`

Description: A SetValue command that changes the set of active field maps (thus changing the active zones) considered for plotting.

Examples:

Example 1:

Make only field maps 1, 3, 4 and 5 active for plotting:

```
$!ACTIVEFIELDMAPS = [1,3-5]
```

Example 2:

Add zones 33, 34, 35, and 36 to the set of active field maps:

```
$!ACTIVEFIELDMAPS += [33-36]
```

Example 3:

Remove zones 1, 2, 3, 9, 10 and 11 from the set of active field maps:

```
$!ACTIVEFIELDMAPS -= [1-3,9-11]
```

$!ACTIVELINEMAPS

Syntax: `$!ACTIVELINEMAPS` <op> <set>
`[no optional parameters]`

Description: A SetValue command that changes the set of line mappings considered for plotting.

Examples:

Example 1:

Make only line-mappings 1, 3, 4 and 5 active for plotting:

```
$!ACTIVELINEMAPS = [1,3-5]
```

Example 2:

Add line-maps 33, 34, 35 and 36 to the set of active line-mappings:

```
$!ACTIVELINEMAPS += [33-36]
```

Example 3:

Remove line-maps 1, 2, 3, 9, 10 and 11 from the set of active line-mappings:

```
$!ACTIVELINEMAPS -= [1-3,9-11]
```

$!ADDMACROPANELTITLE

Syntax: `$!ADDMACROPANELTITLE` <string>
`[no optional parameters]`

Description: Add a title to the **Quick Macro Panel**.

Example: The following example adds the title "Bar Charts" to the **Quick Macro Panel**.

```
$!ADDMACROPANELTITLE "Bar Charts"
```

$!ALTERDATA

Syntax: `$!ALTERDATA` *[zonelist]*
`EQUATION =` <string>
`[optional parameters]`

Description: The `ALTERDATA` function operates on a data set within Tecplot 360 using FORTRAN-like equations. See Section 21 - 1 "Data Alteration through Equations" in the User's Manual for more information on using equations in Tecplot 360. The **<***zonelist***>** parameter specifies the set of zones

on which to operate, where zonelist is a list of zones or zone ranges separated by a comma (","). Zone ranges are separated by a hyphen ("-"). If **<*zonelist*>** is omitted, all zones are affected. NOTE: the values for the **<*zonelist*>** parameter must be enclosed in square brackets. (For example, use `$!ALTERDATA [1,3]` to apply `ALTERDATA` to zones 1 and 3).

Required Parameters

Parameter	Syntax	Default	Notes
EQUATION	= <string>		This assigns the equation to use to operate on the data.

Optional Parameters

Parameter	Syntax	Default	Notes
DATATYPE	= <datatype>	SINGLE	Assign the precision given to the destination variable (that is, the variable on the left hand side of the equation). This only applies if the equation creates a new variable. (See Example 2:)
IGNOREDIVIDEBYZERO	= <boolean>	NO	If YES, the equation will be processed even if it includes a division by zero. 0/0 will result in 0, while other divisions will return the largest or smallest possible result depending on the sign of the dividend. If NO, an equation with a division by zero will not be processed at all.
IRANGE {			See Range Parameters, following, for information on specifying range index values.
MIN	= <integer>	1	
MAX	= <integer>	0	
SKIP }	= <integer>	1	
JRANGE {			See Range Parameters, following, for information on specifying range index values.
MIN	= <integer>	1	
MAX	= <integer>	0	
SKIP }	= <integer>	1	
KRANGE {			See Range Parameters, following, for information on specifying range index values.
MIN	= <integer>	1	
MAX	= <integer>	0	
SKIP }	= <integer>	1	
VALUELOCATION	= <valuelocation>	AUTO	Assign the location to destination variable.

Range Parameters

The `IRANGE, JRANGE`, and `KRANGE` parameters limit the data altered by the equation. The specification of range indices follow these rules:

- All indices start with 1 and go to some maximum index *m*.
- The number 0 can be used to represent the maximum index *m*. If the maximum index *m* = 15, specifying 0 sets the range index to 15.
- Negative values represent the offset from the maximum index. If a value of -2 is specified, and the maximum index *m* is 14, the value used is 14-2, or 12.

Examples:

Example 1:

The following example adds one to X for zones 1 and 3 for every data point:

```
$!ALTERDATA [1,3]
  EQUATION = "x = x+1"
```

Example 2:

The following example creates a new, double precision variable called DIST:

```
$!ALTERDATA
  EQUATION = "{DIST} = SQRT(X**2 + Y**2)"
  DATATYPE = DOUBLE
```

Example 3:

The following equations set a variable called P to zero along the boundary of an IJ-ordered zone:

```
$!ALTERDATA
  EQUATION = "{P} = 0"
  IRANGE {MAX = 1}
$!ALTERDATA
  EQUATION = "{P} = 0"
  IRANGE {MIN = 0}
$!ALTERDATA
  EQUATION = "{P} = 0"
  JRANGE {MAX = 1}
$!ALTERDATA
  EQUATION = "{P} = 0"
  JRANGE {MIN = 0}
```

Example 4:

By following a variable reference with brackets "[" and "]" you may designate a specific zone from which to get the variable value. For example:

```
V3 = V3 -V3[1]
X = (X[1] + X[2] + X[3]) / 3
{TempAdj} = {Temp}[7] - {Adj}
V7 = V1[19] - 2*C[21] + {R/T}[18]
```

The zone number must be a positive integer constant less than or equal to the number of zones. The zone designated must have the same structure (finite-element, I-, IJ-, or IJK-ordered) and dimensions (number of nodes and so forth)

$!ANIMATECONTOURLEVELS

Syntax:
```
$!ANIMATECONTOURLEVELS
   START = <integer>
   END   = <integer>
[optional parameters]
```

Description: Produce an animation of a contour line plot by showing a single level at a time. The animation varies according to the currently defined contour levels and is limited by the values in the START, END, and SKIP parameters. To create a movie file, add $!EXPORTSETUP commands before this

command.

Required Parameters

Parameter	Syntax	Default	Notes
START	= <integer>		Starting contour level number to animate.
END	= <integer>		Ending contour level number to animate.

Optional Parameters

Parameter	Syntax	Default	Notes
CREATEMOVIEFILE	= <boolean>	NO	If YES, must be preceded by $!EXPORTSETUP commands.
SKIP	= <integer>	1	Level skip.

Example: The following command animates the first four contour levels to an AVI file:

```
$!EXPORTSETUP EXPORTFORMAT = AVI
$!EXPORTSETUP EXPORTFNAME = "contourlevels.avi"
$!ANIMATECONTOURLEVELS
   START = 1
   END   = 4
 CREATEMOVIEFILE = YES
```

$!ANIMATEIJKBLANKING

Syntax: $!ANIMATEIJKBLANKING
NUMSTEPS = <integer>
[optional parameters]

Description: Produce an animation of different IJK-blankings in your plot. The animation starts at one IJK-blanking setting and marches through intermediate steps to a second setting. To create a movie file, add $!EXPORTSETUP commands before this command.

Required Parameter

Parameter	Syntax	Default	Notes
NUMSTEPS	= <integer>		Number of intermediate steps for the animation.

Optional Parameters

Parameter	Syntax	Default	Notes
IMINFRACT	= <dexp>	0.1	Minimum fraction for blanking at the start of animation for the I-index. Actual I-index is equal to IMINFRACT*IMAX.
JMINFRACT	= <dexp>	0.1	Minimum fraction for blanking at the start of animation for the J-index. Actual J-index is equal to JMINFRACT*JMAX.
KMINFRACT	= <dexp>	0.1	Minimum fraction for blanking at the start of animation for the K-index. Actual K-index is equal to KMINFRACT*KMAX.
IMAXFRACT	= <dexp>	1.0	Maximum fraction for blanking at the start of animation for the I-index. Actual I-index is equal to IMAXFRACT*IMAX.
JMAXFRACT	= <dexp>	1.0	Maximum fraction for blanking at the start of animation for the J-index. Actual J-index is equal to JMAXFRACT*JMAX.
KMAXFRACT	= <dexp>	1.0	Maximum fraction for blanking at the start of animation for the K-index. Actual K-index is equal to KMAXFRACT*KMAX.
IMINFRACT2	= <dexp>	0.8	Minimum fraction for blanking at the end of animation for the I-index. Actual I-index is equal to IMINFRACT*IMAX.
JMINFRACT2	= <dexp>	0.8	Minimum fraction for blanking at the end of animation for the J-index. Actual J-index is equal to JMINFRACT*JMAX.
KMINFRACT2	= <dexp>	0.8	Minimum fraction for blanking at the end of animation for the K-index. Actual K-index is equal to KMINFRACT*KMAX.
IMAXFRACT2	= <dexp>	1.0	Maximum fraction for blanking at the end of animation for the I-index. Actual I-index is equal to IMAXFRACT*IMAX.
JMAXFRACT2	= <dexp>	1.0	Maximum fraction for blanking at the end of animation for the J-index. Actual J-index is equal to JMAXFRACT*JMAX.
KMAXFRACT2	= <dexp>	1.0	Maximum fraction for blanking at the end of animation for the K-index. Actual K-index is equal to KMAXFRACT*KMAX.
CREATEMOVIEFILE	= <boolean>	NO	If YES, must be preceded by $!EXPORTSETUP commands.

Example:

The following example produces an animation showing a band of I-planes traversing the entire data field:

```
$!ANIMATEIJKBLANKING
NUMSTEPS = 6
IMINFRACT = 0.1
JMINFRACT = 0.0
KMINFRACT = 0.0
IMAXFRACT = 1.0
JMAXFRACT = 1.0
KMAXFRACT = 1.0
IMINFRACT2 = 1.0
JMINFRACT2 = 0.0
KMINFRACT2 = 0.0
IMAXFRACT2 = 1.0
JMAXFRACT2 = 1.0
KMAXFRACT2 = 1.0
```

$!ANIMATEIJKPLANES

Syntax: $!ANIMATEIJKPLANES

```
START = <integer>
END   = <integer>
   [optional parameters]
```

Description: Produce an animation that cycles through I-, J-, or K-planes in an IJK-ordered data set. To create a movie file, add $!EXPORTSETUP commands before this command.

Required Parameters

Parameter	Syntax	Default	Notes
START	= <integer>		Starting plane index
END	= <integer>		Ending plane index

Optional Parameters

Parameter	Syntax	Default	Notes
CREATEMOVIEFILE	= <boolean>	NO	If YES, must be preceded by $!EXPORTSETUP commands
PLANES	= <ijkplane>	I	Specify I, J or K
SKIP	= <integer>	1	Index skip

Example: The following example generates an animation of the I-planes 1, 3, 5, 7, and 9:

```
$!ANIMATEIJKPLANES
PLANES = I
START = 1
END    = 9
SKIP   = 2
```

$!ANIMATEISOSURFACES

Syntax:
```
$!ANIMATEISOSURFACES
    STARTVALUE = <double>
    ENDVALUE = <double>
    [optional parameters]
```

Description: The macro command $!ANIMATEISOSURFACES produces an animation of a series of iso-surfaces beginning with the iso-surface defined by STARTVALUE and ending with the iso-surface defined by ENDVALUE. To create a movie file, add $!EXPORTSETUP commands before this command.

Required Parameters

Parameter	Syntax	Default	Notes
ENDVALUE	= <integer>		ENDVALUE is the value of the contour variable for the last iso-surface in the animation.
NUMSTEPS	= <integer>	2	Number of iso-surfaces to distribute between the start and end iso-surfaces values.
STARTVALUE	= <integer>		STARTVALUE is the value of the contour variable for the first iso-surface in the animation.

Optional Parameters

Parameter	Syntax	Default	Notes
CREATEMOVIEFILE	= <boolean>	NO	If YES, must be preceded by $!EXPORTSETUP commands.
GROUP	= <integer>	1	values 1- 8
LIMITSCREENSPEED	= <boolean>	No	
MAXSCREENSPEED	= <double>		You may need to reduce the value to correlate with the speed of your computer.

Go To, *Loop*, *Bounce*, *Forward*, and *Backward* are only used by the interface. *Forward* and *Backward* can be simulated using appropriate values **STARTVALUE** and **ENDVALUE**. If **ENDVALUE < STARTVALUE**, the animation goes 'backward'. If **ENDVALUE > STARTVALUE**, the animation goes 'forward'. *Goto* can be simulated if **ENDVALUE == STARTVALUE**. That is, it can be simulated if the animation goes 'one step'. *Loop* and *Bounce* can be accomplished by calling the file multiple times.

When recording, the macro recorded contains exactly the animation done in the interface. So if you bounce three times through the data, you will record three sets of forward and backwards commands. Similarly, if you use the "one step" options a lot, you will record a lot of individual macro commands. If you interrupt part way through an animation, you will record a partial animation macro of those steps you did animate through.

Example: The following example creates an animation of iso-surfaces:

```
$!ANIMATEISOSURFACES
   STARTVALUE = 1
   ENDVALUE = 30
   NUMSTEPS = 30
```

$!ANIMATELINEMAPS

Syntax:
```
$!ANIMATELINEMAPS
START = <integer>
END = <integer>
[optional parameters]
```

Description: Produce an animation of one Line-mapping at a time. To create a movie file, add $!EXPORTSETUP commands before this command.

Required Parameters

Parameter	Syntax	Default	Notes
START	= <integer>		Starting Line-map number
END	= <integer>		Ending Line-map number

Optional Parameters

Parameter	Syntax	Default	Notes
SKIP	= <integer>	1	Line-map skip
CREATEMOVIEFILE	= <boolean>	NO	If YES, must be preceded by $!EXPORTSETUP commands

Example:

The following example creates an animation showing plots of Line-maps 2, 4, 6, 8 and 10:

```
$!ANIMATELINEMAPS
START = 2
END   = 10
SKIP = 2
```

$!ANIMATESLICES

Syntax: `$!ANIMATESLICES` [Group]
`START = <integer>`
`END = <integer>`
`[optional parameters]`

Description: The macro command `$!ANIMATESLICES` uses the currently defined start and end slice position. Use `$!SLICEATTRIBUTES` to set these positions; `$!ANIMATESLICES` then redefines how many intermediate slices are to be used, then animates a sub-set of those slices. To create a movie file, add `$!EXPORTSETUP` commands before this command.

Required Parameters

Parameter	Syntax	Default	Notes
START	= <integer>		START and END are measured in steps based on NUMSLICES between the slice group's start slice value (at step=1) and end slice values (at step = NumSlices).
END	= <integer>		START and END are measured in steps based on NUMSLICES between the slice group's start slice value (at step=1) and end slice values (at step = NumSlices).
NUMSLICES	= <integer>		Number of slices to distribute between the start and end slice locations as defined by START and END in $!SLICEATTRIBUTES.

Optional Parameters

Parameter	Syntax	Default	Notes
GROUP	= <integer>	1	values 1- 8
CREATEMOVIEFILE	= <boolean>	NO	If YES, must be preceded by $!EXPORTSETUP commands.
LIMITSCREENSPEED	= <boolean>		
MAXSCREENSPEED	= <double>		

Go To, *Loop*, *Bounce*, *Forward*, and *Backward* are only used by the interface. *Forward* and *Backward* can be simulated using appropriate values **STARTVALUE** and **ENDVALUE**. If **ENDVALUE < STARTVALUE**, the animation goes 'backward'. If **ENDVALUE > STARTVALUE**, the animation goes 'forward'. *Goto* can be

simulated if **ENDVALUE == STARTVALUE**, i.e. the animation goes 'one step'. *Loop* and *Bounce* can be accomplished by calling the file multiple times.

When recording, the macro recorded contains exactly the animation done in the interface. So if you bounce three times through the data, you will record three sets of forward and backwards commands. Similarly, if you use the "one step" options a lot, you will record a lot of individual macro commands. If you interrupt part way through an animation, you will record a partial animation macro of those steps you did animate through.

Example: The following example creates an animation of 3D slices:

```
$!ANIMATESLICES
   START = 1
   END = 30
   NUMSLICES = 30
```

$!ANIMATESTREAM

Syntax: `$!ANIMATESTREAM`
`[optional parameters]`

Description: Produce an animation of stream markers or dashes, moving along the currently defined streamtrace paths. To create a movie file, add `$!EXPORTSETUP` commands before this command.

Optional Parameters

Parameter	Syntax	Default	Notes
STEPSPERCYCLE	= <integer>	20	Number of steps to use for each cycle of the animation. Increase this number to produce a smoother animation.
CREATEMOVIEFILE	= <boolean>	NO	If YES, must be preceded by $!EXPORTSETUP commands
NUMCYCLES	= <integer>	3	Number of cycles in the animation. Each cycle shows stream markers or dashes, moving along a streamtrace path. If DT is the streamtrace delta time, then at the end of the cycle, the markers or dashes will have moved `(2*DT*(STEPSPERCYCLE-1))/(STEPSPERCYCLE)` in time.

Example:

The following example animates streamtraces for five cycles with each cycle using ten steps:

```
$!ANIMATESTREAM
STEPSPERCYCLE = 10
NUMCYCLES     = 5
```

$!ANIMATETIME

Syntax: `$!ANIMATETIME`
`[optional parameters]`

Description: Produce an animation of transient data. To create a movie file, add `$!EXPORTSETUP` commands before this command.

Optional Parameters:

Parameter	Syntax	Default	Notes
CREATEMOVIEFILE	= <boolean>	NO	If YES, must be preceded by $!EXPORTSETUP commands.
ENDTIME	= <double>	The last timestep as defined by the currently active strands	If the SolutionTime entered does not exist, the nearest SolutionTime less than the entered time is used.
LIMITSCREENSPEED	= <boolean>	NO	
MAXSCREENSPEED	= <double>	12	only works if LIMITSCREENSPEED is YES
SKIP	= <integer>	1	
STARTTIME	= <double>	first time step as defined by the currently active strands	If the SolutionTime entered does not exist, the nearest SolutionTime less than the entered time is used.

Go To, *Loop*, *Bounce*, *Forward*, and *Backward* are only used by the interface. *Forward* and *Backward* can be simulated using appropriate values STARTVALUE and ENDVALUE. If ENDVALUE < STARTVALUE, the animation goes 'backward'. If ENDVALUE > STARTVALUE, the animation goes 'forward'. *Goto* can be simulated if ENDVALUE == STARTVALUE, i.e. the animation goes 'one step'. *Loop* and *Bounce* can be accomplished by calling the file multiple times.

When recording a macro, that macro animates exactly as done in the interface. So if you bounce three times through the data, you will record three sets of forward and backwards commands. Similarly, if you use the "one step" options a lot, you will record a lot of individual macro commands. If you interrupt part way through an animation, you will record a partial animation macro of those steps you did animate through.

$!ANIMATEZONES

Syntax:
```
$!ANIMATEZONES
  START = <integer>
  END = <integer>
    [optional parameters]
```

Description: Produce an animation showing one zone at a time. To create a movie file, add $!EXPORTSETUP commands before this command. This command will not work if the active frame contains a transient data set.

Required Parameters

Parameter	Syntax	Default	Notes
START	= <integer>		Starting zone number
END	= <integer>		Ending zone number

Optional Parameters

Parameter	Syntax	Default	Notes
ZONEANIMATIONMODE	= *[STEPBYNUMBER, GROUPSTEPBYNUMBER, STEPBYTIME]*	STEPBYNUMBER	
CREATEMOVIEFILE	= <boolean>	NO	If YES, must be preceded by $!EXPORTSETUP commands.
SKIP	= <integer>	1	Zone skip.

Example: The following example animates just the first five zones:

```
$!ANIMATEZONES
START = 1
END = 5
```

$!ATTACHDATASET

Syntax: `$!ATTACHDATASET`
`[optional parameter]`

Description: Attach the active frame to the data set of another frame. Use PAGENUM, if the other frame is on a difference page. This command is usually found only in layout files generated by Tecplot 360. Note that the `$!PLOTTYPE` command automatically executes an `$!ATTACHDATASET` command if a frame mode is requested in a frame that does not have an attached data set. Tecplot 360 attaches the data set from the closest frame (in drawing order) having an attached data set.

Optional Parameter

Parameter	Syntax	Default	Notes
FRAME	= <integer>	First frame with a data set	Within the page specified or implied, if FRAME is not supplied, Tecplot 360 searches for a data set in a frame below the topmost frame of the page to attach.
PAGENUM	= <integer>	current page	If PAGENUM is not supplied the current page is used.

Examples:

Example 1:

The following example attaches to the active frame the data set from the second frame drawn when doing a Redraw All:

```
$!ATTACHDATASET
FRAME = 2
```

Example 2:

The following example attaches to the active frame the data set from the frame drawn next-to-last when doing a Redraw All:

```
$!ATTACHDATASET
```

$!ATTACHGEOM

Syntax: `$!ATTACHGEOM`
`[optional parameters]`
`<geometryrawdata>`

Description: Attach a geometry to the active frame.

Required Parameter

Parameter	Syntax	Default	Notes
<geometryrawdata>			This is the data which defines the size and relative shape of the geometry. This must be at the end of the command after any other parameters.

Optional Parameters

Parameter	Syntax	Default	Notes
ANCHORPOS	<<anchorpos>>		This assigns the anchor position of the geometry.
ARROWHEADANGLE	= <dexp>	12	Set the angle for arrowheads (in degrees).
ARROWHEADATTACHMENT	= <arrowheadattachment>	NONE	
ARROWHEADSIZE	= <dexp>	5%	Set the arrowhead size in Y-frame units (0-100).
ARROWHEADSTYLE	= <arrowheadstyle>	PLAIN	
ATTACHTOZONE	= <boolean>	NO	If YES, must include ZONE.
CLIPPING	= <clipping>	CLIPTTOVIEWPORT	
COLOR	= <color>	BLACK	
DATATYPE	= <fielddatatype>	FLOAT	
DRAWORDER	= <draworder>	AFTERDATA	
FILLCOLOR	= <color>	WHITE	
GEOMTYPE	= <geomtype>	LINESEGS	
IMAGEFILENAME	= <string>		
ISFILLED	= <boolean>		
LINEPATTERN	= <linepattern>	SOLID	
LINETHICKNESS	= <dexp>	0.1%	Set the line thickness in Y-frame units (0-100).
MACROFUNCTIONCOMMAND	= <string>	Null	Set the macro command to execute when you hover over the geometry and press Ctrl-right-click. For security reasons this command can only be used in the Tecplot 360 configuration file.
MAINTAINASPECTRATIO	= <boolean>	YES	
NUMELLIPSEPTS	= <integer>	72	Numbers of points to use when drawing ellipses and circles.
PATTERNLENGTH	= <dexp>	2%	Set the pattern length in Y-frame units (0-100).
POSITIONCOORDSYS	= <coordsys>	GRID	
RESIZEFILTER	= <resizefilter>		
SCOPE	= <scope>	LOCAL	Set the scope to GLOBAL to draw this geometry in all “like” frames.
TEXTUREFILTER		CUBIC	
ZONE	= <integer>	1	This is only used if ATTACHTOZONE = YES. This geometry is disabled if the zone assigned here is inactive.

Examples:

Example 1:

The following example creates a red circle, with a radius equal to 25 percent of the height of the frame, in the center of the frame:

```
$!ATTACHGEOM
POSITIONCOORDSYS = FRAME
ANCHORPOS
{
 X = 50
 Y = 50
```

```
}
GEOMTYPE = CIRCLE
COLOR = RED
RAWDATA
25
```

Example 2:

The following example creates an L-shaped polyline with an arrowhead at the end:

```
$!ATTACHGEOM
POSITIONCOORDSYS = FRAME
ANCHORPOS
{
 X = 20
 Y = 80
}
GEOMTYPE = LINESEGS
ARROWHEADATTACHMENT = ATEND
RAWDATA
1
3
0 0
0 -60
40 0
```

$!ATTACHTEXT

Syntax:
```
$!ATTACHTEXT
TEXT = <string>
[optional parameters]
```

Description: Attach text to the active frame

Required Parameter

Parameter	Syntax	Default	Notes
TEXT	= <string>		Text string to draw.

Optional Parameters

Parameter	Syntax	Default	Notes
ANCHOR	= <textanchor>	LEFT	Specifies what part of the text to anchor to the frame.
ANCHORPOS	<<anchorpos>>		This assigns the anchor position for the text. Units are dependent on POSITIONCOORDSYS.
ANGLE	= <dexp>	0.0	Text angle (in degrees).
ATTACHTOZONE	= <boolean>	NO	If YES, must include ZONE.

BOX
{
BOXTYPE
COLOR
FILLCOLOR
LINETHICKNESS
MARGIN
}
	
	= <boxtype>
	= <color>
	= <color>
	= <dexp>
	= <dexp>
		
		NONE
		BLACK
		WHITE
		0.1%
		20
			
			The margin is the space between the text and box. The margin is measured in terms of the percentage of the text height.

CLIPPING	= <clipping>	CLIPTOVIEWPORT	
COLOR	= <color>	BLACK	
LINESPACING	= <dexp>	1.0	Line spacing to use if text contains multiple lines.
MACROFUNCTION COMMAND	= <string>	NULL	Set the macro command to execute when you hover over the geometry and press Ctrl-right-click.
POSITIONCOORDSYS	= <coordsys>	FRAME	values = FRAME, GRID or GRID3D

TEXTSHAPE
{
FONTFAMILY
ISBOLD
ISITALIC
HEIGHT
SIZEUNITS
}
	
	= <string>
	= <boolean>
	= <boolean>
	= <dexp>
	= <sizeunits>
		
		"Helvetica"
		YES
		NO
		14
		POINT
			
			The following combinations of SIZEUNITS and POSITIONCOORDSYS are allowed: FRAME/FRAME, POINT

SCOPE	= <scope>	LOCAL	Set the scope to GLOBAL to include this text in all "like" frames.
ZONE	= <integer>	1	This is only used if ATTACHZONE = YES. This text is disabled if the zone assigned here is inactive.

Examples:

Example 1:

The following example creates the text ABC and positions it in the lower left corner of the frame:

```
$!ATTACHTEXT
TEXT = "ABC"
```

Example 2:

The following example creates the text TEXT AT AN ANGLE and places it in the center of the frame. The text is drawn at an angle of 45 degrees:

```
$!ATTACHTEXT
TEXT =  "TEXT AT AN ANGLE"
ANGLE = 45
ANCHORPOS {X=50 Y=50}
```

Example 3:

The following example creates the text TIMES-ROMAN using the Times Roman font. This text includes a text box:

```
$!ATTACHTEXT
TEXT =  "TIMES-ROMAN"
TEXTSHAPE
{
 FONTFAMILY = "Times"
 ISBOLD = NO
 ISITALIC = NO
}
BOX
{
 BOXTYPE = PLAIN
 MARGIN  = 20
}
ANCHORPOS {X=20 Y=20}
```

B

$!BASICCOLOR

Syntax: `$!BASICCOLOR`
`[optional parameters]`

Description: A SetValue command that sets the red, green and blue components for any of the basic colors in Tecplot 360.

Optional Parameters

Parameter	Syntax	Default	Notes
BLACK	<<rgb>>	See Notes	R=0, G=0, B=0
BLUE	<<rgb>>	See Notes	R=45, G=45, B=255
CUSTOM1... **CUSTOM56**	<<rgb>>		The default varies.
CYAN	<<rgb>>	See Notes	R=0, G=255, B=255
GREEN	<<rgb>>	See Notes	R=0, G=210, B=0
PURPLE	<<rgb>>	See Notes	R=255, G=0, B=0
RED	<<rgb>>	See Notes	R=210, G=0, B=0
WHITE	<<rgb>>	See Notes	R=255, G=255, B=255
YELLOW	<<rgb>>	See Notes	R=255, G=255, B=45

Example: Set the CUSTOM8 color to be brown:

```
$!BASICCOLOR
CUSTOM8
{
 R = 165
 G  = 42
 B  = 42
}
```

$!BASICCOLORLEGEND

Syntax: $!BASICCOLORLEGEND
[optional parameters]

Description: A SetValue command that allows you to create and set the style of a legend for the basic colors in Tecplot 360. The legend can be used to display any attribute of the plot represented by a basic color (for example, materials). Each frame maintains a mapping of basic colors to names. Each basic color actually used in selected layers of the plot appears in the legend unless it is excluded.

Optional Parameters

Parameter	Syntax	Default	Notes
ANCHORALIGNMENT	= <anchoralignment>	TOPRIGHT	
BASICCOLORCONTROL			Name may include dynamic text variables (for example, to incoproate auxiliary data)
{			
BLACK	<<basiccolorcontrol>>	See notes	NAME = '', SHOW = YES
BLUE	<<basiccolorcontrol>>	See notes	NAME = '', SHOW = YES
CUSTOM1... CUSTOM56	<<basiccolorcontrol>>	See notes	NAME = '', SHOW = YES
CYAN	<<basiccolorcontrol>>	See notes	NAME = '', SHOW = YES
GREEN	<<basiccolorcontrol>>	See notes	NAME = '', SHOW = YES
PURPLE	<<basiccolorcontrol>>	See notes	NAME = '', SHOW = YES
RED	<<basiccolorcontrol>>	See notes	NAME = '', SHOW = YES
WHITE	<<basiccolorcontrol>>	See notes	NAME = '', SHOW = YES
YELLOW	<<basiccolorcontrol>>	See notes	NAME = '', SHOW = YES
}			
BOX	<<textbox>>	See notes	BOXTYPE = HOLLOW, MARGIN = 10, LINETHICKNESS = 0.1, COLOR = BLACK, FILLCOLOR = WHITE
FIELDLAYERCONTROL			Determines which field layers' colors are included in legend
{			
USEMESH	= <boolean>	NO	
USECONTOUR	= <boolean>	NO	
USEVECTOR	= <boolean>	NO	
USESCATTER	= <boolean>	NO	
USESHADE	= <boolean>	NO	
USEEDGE	= <boolean>	NO	
}			
HEADERTEXT	= <string>		May include dynamic text variables
HEADERTEXTCOLOR	= <color>	BLACK	
HEADERTEXTSHAPE	<<textshape>>	See notes	FONTFAMILY = 'Helvetica', ISBOLD = YES, ISITALIC = NO, SIZEUNITS = FRAME, HEIGHT = 2.5
LABELTEXTCOLOR	= <color>	BLACK	
LABELTEXTSHAPE	<<textshape>>	See notes	FONTFAMILY = 'Helvetica', ISBOLD = NO, ISITALIC = NO, SIZEUNITS = FRAME, HEIGHT =2.5
LINELAYERCONTROL			Determines which line layers' colors are included in legend
{			
USELINES	= <boolean>	NO	
USESYMBOLS	= <boolean>	NO	
USEBARS	= <boolean>	NO	
USEERRORBARS	= <boolean>	NO	
}			
ROWSPACING	<op> <dexp>	= 1.2	
SHOW	= <boolean>	NO	
SHOWSYMBOLOUTLINE	= <boolean>	YES	
SORTBYLABELTEXT	= <boolean>	YES	
SYMBOLHEIGHT	= <dexp>	2.5	

Parameter	Syntax	Default	Notes
SYMBOLLINETHICKNESS	= <dexp>	0.1	
SYMBOLWIDTH	= <dexp>	2.5	
XYPOS	<<xy>>	X = 95, Y = 75	

Example: Create a basic color legend for a fruity plot:

```
$!BASICCOLORLEGEND
  SHOW = YES
  LINELAYERCONTROL
    {
    USELINES = YES
    }
  XYPOS
    {
    X = 70
    Y = 80
    }
  HEADERTEXT = '&(ZoneName[1])'
  BOX
    {
    BOXTYPE = FILLED
    }
  BASICCOLORCONTROL
    {
    BLACK
      {
      SHOW = NO
      }
    RED
      {
      NAME = 'Apple'
      }
    GREEN
      {
      NAME = 'Bean'
      }
    BLUE
      {
      NAME = 'Blueberry'
      }
    CYAN
      {
      NAME = 'Kiwi'
      }
    YELLOW
      {
      NAME = 'Banana'
      }
    PURPLE
      {
      NAME = 'Grape'
      }
    }
```

$!BASICSIZE

Syntax: `$!BASICSIZE`
`[optional parameters]`

Description: A SetValue command that sets sizes of various objects like line thicknesses, line pattern length,

font height, and so forth. Sizes can be assigned when interacting with Tecplot 360 by either entering an exact value or by choosing from a preset list of values. The `$!BASICSIZE` command allows you to change the values in the preset lists.

Optional Parameters

Parameter	Syntax	Default	Notes
ARROWHEADSIZES	<<basicsizelist>>	See Notes	Tiny=1.0, Small=3.0, Medium=5.0, Large=8.0, Huge=12.0
FRAMETEXTSIZES	<<basicsizelist>>	See Notes	Tiny=1.5, Small=2.0, Medium=3.0, Large=6.0, Huge=10.0
LINEPATLENGTHS	<<basicsizelist>>	See Notes	Tiny=0.5, Small=0.8, Medium=2.0, Large=3.0, Huge=5.0
LINETHICKNESSES	<<basicsizelist>>	See Notes	Tiny=0.02, Small=0.1, Medium=0.4, Large=0.8, Huge=1.5
POINTTEXTSIZES	<<basicsizelist>>	See Notes	Tiny=8, Small=11, Medium=14, Large=28, Huge=50
SYMBOLSIZES	<<basicsizelist>>	See Notes	Tiny=0.5, Small=1.0, Medium=2.5, Large=4.0, Huge=8.0
TICKLENGTHS	<<basicsizelist>>	See Notes	Tiny=0.5, Small=1.2, Medium=2.0, Large=3.0, Huge=5.0

Example: Change the medium line pattern length to be 2.5 percent:

```
$!BASICSIZE
LINEPATLENGTHS
{
 MEDIUM = 2.5
}
```

$!BLANKING

Syntax: `$!BLANKING`
`[optional parameters]`

Description: A SetValue command that changes settings for IJK- or value-blanking.

Optional Parameters

Parameter	Syntax	Default	Notes
DEPTH			
{			
INCLUDE	= <boolean>	NO	If YES, draws only those portions at the plot with depth values within the FROMFRONT and FROMBACK limits.
FROMFRONT	= <double>	0	FROMFRONT and FROMBACK are expressed as percentages of the overall 3D depth.
FROMBACK	= <double>	0	FROMFRONT and FROMBACK are expressed as percentages of the overall 3D depth.
}			
IJK			
{			
INCLUDE	= <boolean>	NO	
IJKBLANKMODE	<op> <boolean>		
IMINFRACT	= <ijkblankmode>	0	Minimum and maximum fractions are in terms of percentages (0-100). Zero represents an index of one and 100 the maximum index.
JMINFRACT	<op> <dexp>	= 0	
KMINFRACT	<op> <dexp>	= 0	
IMAXFRACT	<op> <dexp>	= 50	
JMAXFRACT	<op> <dexp>	= 50	
KMAXFRACT	<op> <dexp>	= 50	
ZONE	= <integer>	0	Only one zone can be assigned to use IJK-blanking.
}			
VALUE			
{			
BLANKENTIRECELL	= <boolean>	YES	Set to NO to get precision-blanking.
CONSTRAINT nnn	*nnn* = <integer>	1	Use <integer> to specify which constraint to modify.
{			
COLOR	= <color>	BLACK	
CONSTRAINTOP2MODE	= <constrainintop2mode>	USECONSTANT	
INCLUDE	= <boolean>	NO	
LINEPATTERN	= <linepattern>	SOLID	
LINETHICKNESS	= <double>	0.4	
PATTERNLENGTH	= <dexp>	2	
RELOP	= <valueblankrelop>	LESSTHANOREQUAL	
SHOW	= <boolean>	NO	
VALUECUTOFF	= <double>	0	
VARA	= <integer>	None	
VARB	= <integer>	None	
}			
INCLUDE	= <boolean>	NO	Set to NO to turn off all value-blanking.
VALUEBLANKCELLMODE	= <valueblankcellmode>	ANY CORNER	
}			

Examples:

Example 1:

Set IJK-blanking to cut away the minimum index corner:

```
$!BLANKING
IJK
{
 INCLUDE   = YES
 IMINFRACT = 0
 JMINFRACT = 0
 KMINFRACT = 0
 IMAXFRACT = 50
 JMAXFRACT = 50
 KMAXFRACT = 50
}
```

Example 2:

Use value blanking to cut away all cells that have at least one node where variable 3 is less than or equal to 7.5:

```
$!BLANKING
VALUE
{
 INCLUDE = YES
 CONSTRAINT 1
 {
    INCLUDE = YES
    VARA = 3
    RELOP = LESSTHANOREQUAL
    VALUECUTOFF = 7.5
 }
}
```

$!BRANCHCONNECTIVITY

Syntax: `$!BRANCHCONNECTIVITY`
`ZONE = <integer>`
`[no optional parameters]`

Description: For zones where connectivity is shared, this command allows for branching of connectivity information from the specified zone.

Required Parameters

Parameter	Syntax	Default	Notes
ZONE	= <integer>		

Example:

Suppose Zones 2, 3 and 4 share connectivity. This command branches the connectivity of the second zone. Zones 3 and 4 will still share connectivity.

```
$!BRANCHCONNECTIVITY
ZONE = 2
```

$!BRANCHFIELDDATAVAR

Syntax: $!BRANCHFIELDDATAVAR
ZONE = <integer>
VAR = <integer>
[no optional parameters]

Description: Allows for branching of specified variable in the specified zone for zones that share variables.

Required Parameters

Parameter	Syntax	Default	Syntax
VAR	= <integer>		
ZONE	= <integer>		

Example:

Assume Zones 1, 2 and 4 share variables 3 and 5. This command branches the third variable from the second zone. Variable 3 will still be shared by zones 1 and 4, while variable 5 will still be shared by all three zones.:

```
$!BRANCHFIELDDATAVAR
ZONE = 2
VAR   = 3
```

$!BREAK

Syntax: $!BREAK
[no parameters]

Description: Jump out of the current $!LOOP-ENDLOOP or $!WHILE-$!ENDWHILE.

Example:

```
$!LOOP 5
$!BREAK
$!ENDLOOP
```

C

$!COLORMAPCONTROL [<*groupnumber*>] *[Required-Control Option]*

Description: The different commands in the COLORMAPCONTROL compound function family are described separately in the following sections. Group number is an optional parameter ranging from 1 to 8, which defaults to 1 when omitted.

The COLORMAPCONTROL compound functions are:

```
$!COLORMAPCONTROL [<groupnumber>] REDISTRIBUTECONTROLPOINTS
$!COLORMAPCONTROL [<groupnumber>] COPYSTANDARD
$!COLORMAPCONTROL [<groupnumber>] RESETTOFACTORY
```

$!COLORMAPCONTROL [<*groupnumber*>] REDISTRIBUTECONTROLPOINTS

Syntax: `$!COLORMAPCONTROL [<groupnumber>] REDISTRIBUTECONTROLPOINTS`
`[no parameters]`

Description: Redistribute the control points for the currently active color map so they are evenly spaced across the color map. This is equivalent to clicking Redistribute Control Points in the Color Map dialog. This does not change the RGB values assigned at each control point. Group number is an optional parameter ranging from 1 to 8, which defaults to 1 when omitted.

Example:

```
$!COLORMAPCONTROL REDISTRIBUTECONTROLPOINTS
```

$!COLORMAPCONTROL [<*groupnumber*>] COPYSTANDARD

Syntax: `$!COLORMAPCONTROL [<groupnumber>] COPYSTANDARD`
`CONTOURCOLORMAP = <standardcolormap>`

Description: Preset either the user-defined color map or the raw user-defined color map to be a copy of one of the standard color maps. Tecplot 360 must currently be using either the user-defined color map or the raw user-defined color map in order to use this function. Group number is an optional parameter ranging from 1 to 8, which defaults to 1 when omitted.

Required Parameter

Parameter	Syntax	Default	Notes
CONTOURCOLORMAP	= <standardcolormap>	LGRAINBOW	The color map to copy.

Example:

The following example sets the current color map to be a copy of the small rainbow color map:

```
$!COLORMAPCONTROL COPYSTANDARD
CONTOURCOLORMAP = SMRAINBOW
```

$!COLORMAPCONTROL [<*groupnumber*>] RESETTOFACTORY

Syntax: `$!COLORMAPCONTROL [<groupnumber>] RESETTOFACTORY`
`[no parameters]`

Description: Redistribute the control points and reset the RGB values for the currently active color map. This is equivalent to clicking Reset on the Color Map dialog. Group number is an optional parameter ranging from 1 to 8, which defaults to 1 when omitted.

Example:

```
$!COLORMAPCONTROL RESETTOFACTORY
```

$!COMPATIBILITY

Syntax: `$!COMPATIBILITY`
`[optional parameters]`

Description: Allow datasharing access and setting, without warning.

Optional Parameters

Parameter	Syntax	Default	Notes
ALLOWDATASHARING	= <boolean>	YES	If NO, Tecplot 360 will not allow data sharing. This may be necessary to use older add-ons that cannot handle shared data.
ALLOWOLDTEXT FORMATTING	= <boolean>	NO	If NO, allows Tecplot 360 to display text subscripts and superscripts created with older Tecplot 360 versions without automatically converting the text to the new formatting.

Example: The following commands turn on datasharing:

```
$!COMPATIBILITY ALLOWDATASHARING=YES
```

$!CONTINUE

Syntax: `$!CONTINUE`

Description: Transfer control back to nearest `$!LOOP` or `$!WHILE`.

Example:

```
$!LOOP 10
$!CONTINUE
$!ENDLOOP
```

$!CONTOURLABELS *[Required-Control Option]*

Description: The different commands in the `CONTOURLABELS` compound function family are described separately in the following sections.

The `CONTOURLABELS` compound functions are:

```
$!CONTOURLABELS ADD
$!CONTOURLABELS DELETEALL
```

$!CONTOURLABELS ADD

Syntax:
```
$!CONTOURLABELS ADD
[optional parameters]
```

Description: Add contour labels to your plot.

Optional Parameters

Parameter	Syntax	Default	Notes
CONTOURGROUP	= <integer>	1	Defines which contour group is changed.
ISALIGNED	= <boolean>	YES	If YES then align the contour label along the contour line; if NO, draw the label horizontally.
XYZPOS			
{			
X	= <dexp>	0.0	X-position for contour label.
Y	= <dexp>	0.0	Y-position for contour label.
Z	= <dexp>	0.0	Z-position for contour label (use Z only for 3D plots).
}			

Example:

The following commands add labels at (0.5, 0.25) and (0.73, 0.17) in a 2-D field plot.

```
## The labels will be aligned:
$!CONTOURLABELS ADD
CONTOURGROUP = 2
XYZPOS
{
 X = 0.5
 Y = 0.25
}
$!CONTOURLABELS ADD
XYZPOS
{
 X = 0.73
 Y = 0.17
}
```

$!CONTOURLABELS DELETEALL

Syntax: `$!CONTOURLABELS DELETEALL`
`[optional parameters]`

Description: Delete all currently defined contour labels.

Optional Parameters

Parameter	Syntax	Default	Notes
CONTOURGROUP	= <integer>	1	Defines which contour group is changed.

Example:

```
$!CONTOURLABELS DELETEALL
    CONTOURGROUP = 3
```

$!CONTOURLEVELS *[Required-Control Option]*

Description: The different commands in the `CONTOURLEVELS` compound function family are described separately in the following sections.

The `CONTOURLEVELS` compound functions are:

```
$!CONTOURLEVELS ADD
$!CONTOURLEVELS NEW
$!CONTOURLEVELS DELETENEAREST
$!CONTOURLEVELS DELETERANGE
$!CONTOURLEVELS RESET
$!CONTOURLEVELS RESETTONICE
```

$!CONTOURLEVELS ADD

Syntax: `$!CONTOURLEVELS ADD`
<contourlevelrawdata>
`[optional parameters]`

Description: Add a new set of contour levels to the existing set of contour levels.

Required Parameter

Parameter	Syntax	Default	Notes
<contourlevelrawdata>			Supply a list of contour levels to add.

Optional Parameters

Parameter	Syntax	Default	Notes
CONTOURGROUP	= <integer>	1	Defines which contour group is changed.

Example: Add contour levels 1.7, 3.4 and 2.9 to the plot:

```
$!CONTOURLEVELS ADD
RAWDATA
3
1.7
3.4
2.9
```

$!CONTOURLEVELS DELETENEAREST

Syntax: `$!CONTOURLEVELS DELETENEAREST`
`RANGEMIN =` <dexp>
`[optional parameters]`

Description: Delete the contour level whose value is nearest the value supplied in the `RANGEMIN` parameter.

Required Parameter

Parameter	Syntax	Default	Notes
RANGEMIN	= <dexp>		Delete the contour level whose value is nearest to this value.

Optional Parameters

Parameter	Syntax	Default	Notes
CONTOURGROUP	= <integer>	1	Defines which contour group is changed.

Example: Delete the contour level whose value is nearest to 3.4:

```
$!CONTOURLEVELS DELETENEAREST
RANGEMIN = 3.4
```

$!CONTOURLEVELS DELETERANGE

Syntax: `$!CONTOURLEVELS DELETERANGE`
`RANGEMIN = <dexp>`
`RANGEMAX = <dexp>`
`[optional parameters]`

Description: Delete all contour levels between a minimum and maximum contour value (inclusive).

Required Parameters

Parameter	Syntax	Default	Notes
RANGEMIN	= <dexp>		Minimum contour level to delete.
RANGEMAX	= <dexp>		Maximum contour level to delete.

Optional Parameters

Parameter	Syntax	Default	Notes
CONTOURGROUP	= <integer>	1	Defines which contour group is changed.

Example: Delete all contour levels between 0.1 and 0.7:

```
$!CONTOURLEVELS DELETERANGE
RANGEMIN = 0.1
RANGEMAX = 0.7
```

$!CONTOURLEVELS NEW

Syntax: `$!CONTOURLEVELS NEW`
<contourlevelrawdata>
[optional parameters]

Description: Replace the current set of contour levels with a new set.

Required Parameter

Parameter	Syntax	Default	Notes
<contourlevelrawdata>			Supply a list of contour levels to add.

Optional Parameters

Parameter	Syntax	Default	Notes
CONTOURGROUP	= <integer>	1	Defines which contour group is changed.

Example: Replace the current set of contour levels with the levels 0.5, 0.75 and 1.0:

```
$!CONTOURLEVELS NEW
RAWDATA
3
0.5
0.75
1.0
```

$!CONTOURLEVELS RESET

Syntax: `$!CONTOURLEVELS RESET`
`NUMVALUES = <integer>`
`[optional parameters]`

Description: Reset the contour levels to a set of evenly distributed values spanning the entire range of the currently selected contouring variable.

Required Parameter

Parameter	Syntax	Default	Notes
NUMVALUES	= <integer>		New number of contour levels.

Optional Parameters

Parameter	Syntax	Default	Notes
CONTOURGROUP	= <integer>	1	Defines which contour group is changed.

Example: Reset the contour levels to use 150 levels:

```
$!CONTOURLEVELS RESET
NUMVALUES = 150
```

$!CONTOURLEVELS RESETTONICE

Syntax: `$!CONTOURLEVELS RESETTONICE`
`APPROXNUMVALUES = <integer>`
`[optional parameters]`

Description: Reset the contour levels to a set of evenly distributed, nice values spanning the entire range of the currently selected contouring variable, with a specified number of entries.

Required Parameter

Parameter	Syntax	Default	Notes
APPROXNUMVALUES	= <integer>		Approximate number of contour levels desired. Actual value may be different.

Optional Parameters

Parameter	Syntax	Default	Notes
CONTOURGROUP	= <integer>	1	Defines which contour group is changed.

Example: Reset the contour levels to use 150 levels:

```
$!CONTOURLEVELS RESETTONICE
APPROXNUMVALUES = 10
```

$!CREATECIRCULARZONE

Syntax:
```
$!CREATECIRCULARZONE
IMAX = <integer>
JMAX = <integer>
[optional parameters]
```

Description: Create a circular (or cylindrical) IJ- or IJK-ordered zone.

$!CREATEBOUNDARYZONES

Syntax:
```
$!CREATEBOUNDARYZONES <boolean>
[optional parameters]
```

Description: When YES, boundary zones are created. Use this command when working with StarCCM data to preserve backward compatibility. (StarCCM Loader ONLY)

Required Parameters

Parameter	Syntax	Default	Notes
IMax	= <integer>		Radial direction.
JMax	= <integer>		Circumferential direction, must be greater than 3.

Optional Parameters

Parameter	Syntax	Default	Notes
DATATYPE	= <datatype>	SINGLE	
KMax	= <integer>	1	Bottom to top direction
RADIUS	= <dexp>	1	
X	= <dexp>	0	X-coordinate for center.
XVAR	= <integer>	Auto	Only needed when processing journal instructions.
Y	= <dexp>	0	Y-coordinate for center.
YVAR	= <integer>	Auto	Only needed when processing journal instructions.
Z1	= <dexp>	0	Z-minimum if a cylinder is created.
Z2	= <dexp>	1	Z-maximum if a cylinder is created.
ZVAR	= <integer>	Auto	Only needed when processing journal instructions.

Examples:

Example 1:

Create a circular 10 by 20 IJ-ordered zone centered at (5, 5) with a radius of 2:

```
$!CREATECIRCULARZONE
IMax     = 10
JMax     = 20
X        = 5
Y        = 5
RADIUS   = 2
```

Example 2:

Create a cylindrical 5 by 6 by 8 IJK-ordered zone with the bottom centered at (4, 4, 0) and the top centered at (4, 4, 7) and a radius of 3:

```
$!CREATECIRCULARZONE
IMax     = 5
JMax     = 6
KMax     = 8
X        = 4
Y        = 4
Z1       = 0
Z2       = 7
RADIUS   = 3
```

$!CREATECONTOURLINEZONES

Syntax: `$!CREATECONTOURLINEZONES` [group]
`[optional parameters]`

Description: Create zones from the currently-defined contour lines. One zone can be created from each contour level in that plot, or one zone for every polyline can be generated.

Optional Parameters

Parameter	Syntax	Default	Notes
AUTOSTRANDTRANSIENTDATA	= <boolean>	YES	If set to YES, time strands are automatically created for transient data in the new zone.
CONTLINECREATEMODE	= *[ONEZONEPERCONTOURLEVEL or ONEZONEPERINDEPENDENTPOLYLINE*		Select whether one zone per contour lever will be created or whether there will be a zone for each polyline.

Example: Create a new zone for each contour line on an existing contour plot.

```
$!CREATECONTOURLINEZONES
 CONTLINECREATEMODE = ONEZONEPERCONTOURLEVEL
```

$!CREATEFEBOUNDARY

Syntax:
```
$!CREATEFEBOUNDARY
SOURCEZONE = <integer>
[optional parameters]
```

Description: Zone edges for finite element data cannot be turned on or off using the edge plot layer in Tecplot 360. You can, however, create a separate zone which is the boundary of a finite element zone. This new zone can then be turned on or off.

Required Parameter

Parameter	Syntax	Default	Notes
SOURCEZONE	= <integer>		Zone to extract the boundary from.

Optional Parameters

Parameter	Syntax	Default	Notes
AUTOSTRANDTRANSIENTDATA	= <boolean>	YES	If set to YES, time strands are automatically created for transient data in the new zone.
REMOVEBLANKEDSURFACES	= <boolean>	NO	Set to YES if you want the resulting zone to include only the boundary adjacent to non-blanked cells.

Example: Create an FE-boundary zone from zone 3:

```
$!CREATEFEBOUNDARY
SOURCEZONE = 3
```

$!CREATEFESURFACEFROMIORDERED

Syntax:
```
$!CREATEFESURFACEFROMIORDERED
SOURCEZONES = <set>
[optional parameters]
```

Description: A FE-Surface zone can be generated from two or more I-Ordered zones. To get the best possible output, it is recommended that the source zones should have their nodes arranged in a similar manner so that the connecting lines between points are as straightforward as possible. For this reason, indices from source zones should increase in the same direction.

Required Parameter

Parameter	Syntax	Default	Notes
SOURCEZONES	= <set>		Zones whose points will be used to create the new surface.

Optional Parameters

Parameter	Syntax	Default	Notes
AUTOSTRANDTRANSIENTDATA	= <boolean>	YES	If set to YES, time strands are automatically created for transient data in the new zone.
CONNECTSTARTTOEND	= <boolean>	NO	YES allows for closed surfaces.

Example: Create an FE-Surface zone from zones 3 and 4:

```
$!CREATEFESURFACEFROMIORDERED
SOURCEZONES = [3-4]
```

$!CREATEISOZONES

Syntax: `$!CREATEISOZONES`
`[optional parameters]`

Description: Create zones from the currently defined iso-surfaces. One zone will be created from each defined iso-surface. The iso-surfaces must be active and you must have at least one active volume zone.

Optional Parameter

Parameter	Syntax	Default	Notes
AUTOSTRANDTRANSIENTDATA	= <boolean>	YES	If set to YES, time strands are automatically created for transient data in the new zone.

Example:

```
$!CREATEISOZONES
```

$!CREATELINEMAP

Syntax: `$!CREATELINEMAP`
`[no parameters]`

Description: Create a new Line-mapping.

Example:

```
$!CREATELINEMAP
```

$!CREATEMIRRORZONES

Syntax: `$!CREATEMIRRORZONES`
`SOURCEZONES = <set>`
`[optional parameters]`

Description: Create new zones that are mirror images of the source zones

Required Parameter

Parameter	Syntax	Default	Notes
SOURCEZONES	= <set>		Zone(s) to create mirror zone(s) from.

Optional Parameter

Parameter	Syntax	Default	Notes
MIRRORVAR	= <mirrorvar>	'X'	This variable in the new zone is multiplied by -1 after the zone is copied. (Mutually exclusive with MIRRORVARS.)
MIRRORVARS	= <set>		Set of variables in the new zone to be multiplied by -1 after the zone is copied. (Mutually exclusive with MIRRORVAR.)

Example:

Create a mirror of zones 2-4 across the Y-axis (that is, mirror the X-variable) in 2D frame mode:

```
$!CREATEMIRRORZONES
SOURCEZONES = [2-4]
MIRRORVAR   = 'X'
```

$!CREATENEWFRAME

Syntax: `$!CREATENEWFRAME`
`[optional parameters]`

Description: Creates a new frame.

Optional Parameters

Parameter	Syntax	Default	Notes
HEIGHT	= <dexp>	8	Units are in inches.
XYPOS	<<xy>>	X = 1.02 Y = 0.25	Units are in inches; relative to the top left edge of the paper
WIDTH	= <dexp>	9	Units are in inches.

The default position and size of the initial frame created when Tecplot 360 starts up can be changed in the Tecplot 360 configuration file.

Example:

The following example creates a 5- by 5-inch frame with the upper left hand corner of the frame positioned 2 inches from the left edge of the paper and 1 inch from the top:

```
$!CREATENEWFRAME
XYPOS
{
 X = 2
 Y = 1
}
WIDTH = 5
HEIGHT = 5
```

$!CREATERECTANGULARZONE

Syntax: `$!CREATERECTANGULARZONE`
`[optional parameters]`

Description: Create a rectangular zone. If no data set exists when this command is executed, a data set is created with variables X, Y (and Z, if *KMax > 1*). If a data set exists prior to this command, the non-coordinate variables for the zone created are initialized to zero.

Optional Parameters

Parameter	Syntax	Default	Notes
IMax	= <integer>	1	I-dimension.
JMax	= <integer>	1	J-dimension.
KMax	= <integer>	1	K-dimension.
X1	= <dexp>	0	X-minimum.
Y1	= <dexp>	0	Y-minimum.
Z1	= <dexp>	0	Z-minimum.
X2	= <dexp>	1	X-maximum.
Y2	= <dexp>	1	Y-maximum.
Z2	= <dexp>	1	Z-maximum.
XVAR	= <integer>	Auto	Only needed when processing journal instructions.
YVAR	= <integer>	Auto	Only needed when processing journal instructions.
ZVAR	= <integer>	Auto	Only needed when processing journal instructions.
DATATYPE	= <datatype>	SINGLE	

Example:

Create a rectangular IJ-ordered zone dimensioned 20 by 30 where X ranges from 0 to 3 and Y from 3 to 9:

```
$!CREATERECTANGULARZONE
IMax      = 20
JMax      = 30
X1        = 0
Y1        = 3
X2        = 3
Y2        = 9
```

$!CREATESIMPLEZONE

Syntax: `$!CREATESIMPLEZONE` <xyrawdata>
`[optional parameters]`

Description: Create a new zone by specifying only a list of XY-pairs of data. If other zones exist prior to using this function and there are more than 2 variables, then the additional variables are also created and set to zero.

Required Parameter

Parameter	Syntax	Default	Notes
<xyrawdata>			See Chapter 13: "Raw Data" for details.

Optional Parameter

Parameter	Syntax	Default	Notes
DATATYPE	= <datatype>	SINGLE	

Example: Create a simple XY-zone that has the XY-pairs (1, 0), (2, 1), (3, 7) and (5 9):

```
$!CREATESIMPLEZONE
RAWDATA
4
1 0
2 1
3 7
5 9
```

$!CREATESLICEZONEFROMPLANE

Syntax: `$!CREATESLICEZONEFROMPLANE`
`[optional parameters]`

Description: Create a new zone as a slice through existing 3D volume zones. Use $!GLOBALTHREED to define the slicing plane orientation.

Optional Parameters

Parameter	Syntax	Default	Notes
AUTOSTRANDTRANSIENTDATA	= <boolean>	YES	If set to YES, time strands are automatically created for transient data in the new zone.
FORCEEXTRACTIONTO SINGLEZONE	= <boolean>	YES	
SLICESOURCE	= <slicesource>	VOLUMEZONES	

Example: Create a slice zone at *X=0*:

```
$!GLOBALTHREED
SLICE
{
 ORIGIN {X=0}
 NORMAL
 {
 X=1
 Y=0
 Z=0
}
}
$!CREATESLICEZONEFROMPLANE
    SLICESOURCE=VOLUMEZONES
```

$!CREATESLICEZONES

Syntax: `$!CREATESLICEZONES`
`[optional parameter]`

Description: Create a new zone for each slice defined on the Slice Details dialog. Only creates slices from volume zones.

Optional Parameter

Parameter	Syntax	Default	Notes
AUTOSTRANDTRANSIENTDATA	= <boolean>	YES	If set to YES, time strands are automatically created for transient data in the new zone.

Example:

```
$!GLOBALCONTOUR VAR = 4
$!SLICEATTRIBUTES ENDPOSITION {X = 1}
$!SLICEATTRIBUTES STARTPOSITION {X = 6}
$!SLICEATTRIBUTES NUMITERMEDIATESLICES = 6
$!SLICEATTRIBUTES SHOWBEGINENDSLICE = YES
$!SLICEATTRIBUTES SHOWINTERMEDIATESLICES = YES
$!REDRAW
$!CREATESLICEZONES
```

$!CREATESPHERICALZONE

Syntax: `$!CREATECIRCULARZONE`
`IMAX = <integer>`
`JMAX = <integer>`
`[optional parameters]`

Description: Create a spherical IJK-ordered zone.

Required Parameters

Parameter	Syntax	Default	Notes
IMax	= <integer>		Psi direction.
JMax	= <integer>		Theta direction.

Optional Parameters

Parameter	Syntax	Default	Notes
DATATYPE	= <datatype>	SINGLE	
RADIUS	= <dexp>	1	
X	= <dexp>	0	X-coordinate for center.
XVAR	= <integer>	Auto	Only needed when processing journal instructions.
Y	= <dexp>	0	Y-coordinate for center.
YVAR	= <integer>	Auto	Only needed when processing journal instructions.
Z	= <dexp>	0	Z-coordinate for center.
ZVAR	= <integer>	Auto	Only needed when processing journal instructions.

Examples:

Example 1:

Create a spherical 10 by 20 IJ-ordered zone centered at (5, 5) with a radius of 2:

```
$!CREATESPHERICALZONE
  IMax     = 10
  JMax     = 20
  X        = 5
  Y        = 5
  RADIUS   = 2
```

$!CREATESTREAMZONES

Syntax: `$!CREATESTREAMZONES`
`[optional parameters]`

Description: Create one or more zones out of the currently defined streamtraces. The new zones have the same number of variables per data point as the other zones in the data set with all non-coordinate variables interpolated at the positions along the streamtrace.

Optional Parameters

Parameter	Syntax	Default	Notes
AUTOSTRANDTRANSIENTDATA	= <boolean>	YES	If set to YES, time strands are automatically created for transient data in the new zone.
CONCATENATE	= <boolean>	NO	Set to YES to create a single zone out of all common streamtraces. The cell that connects the end of one streamtrace with the beginning of the next can later be turned off using value-blanking.

Example: Create a single zone out of all common streamzones:

```
$!CREATESTREAMZONES
CONCATENATE = YES
```

D

$!DATASETUP

Syntax: `$!DATASETUP`
`[optional parameters]`

Description: A SetValue command that sets miscellaneous parameters related to data.

Optional Parameters

Parameter	Syntax	Default	Notes
COMMANDLINE			
{			This option allows you to auto-strand data files in Tecplot 360. This can be set to NO or commented-out of the configuration file (tecplot.cfg) to retain the Tecplot 10 compatibility
AutoStrandDataFiles	= <boolean>	YES	
}			
SCRATCHDATAFIELDTYPE	= <datatype>		Set the data type for scratch arrays used for geometries line segments and other lines. The default is SINGLE for Windows and DOUBLE for UNIX®. This parameter can only be used in the Tecplot 360 configuration file.
PREPLOTARGS	= <string>		Arguments used to run the included Preplot executable. Preplot is used to convert ASCII datafiles when they are read directly into Tecplot 360. See Section B - 4 "Preplot" in the User's Manual for more information on Preplot and its options.

Example:

Change the arguments used to Preplot ASCII files so only zones 1, 2, and 3 are processed:

```
$!DATASETUP
PREPLOTARGS = "-zonelist 1:3"
```

$!DEFAULTGEOM

Syntax: `$!DEFAULTGEOM`
`[optional parameters]`

Description: A SetValue command that sets the attributes for the default geometry. When a geometry is created interactively, its color, line thickness, and so forth, are preset based on the default geometry. This command is usually used only in the Tecplot 360 configuration file.

Optional Parameters

Parameter	Syntax	Default	Notes
ANCHORPOS	<<xyz>>		
ARROWHEADANGLE	<op> <dexp>		
ARROWHEADATTACHMENT	<arrowheadattachment>		
ARROWHEADSIZE	<op> <dexp>		
ARROWHEADSTYLE	<arrowheadstyle>		
ATTACHTOZONE	= <boolean>		
COLOR	= <color>		
DATATYPE	= <fielddatatype>		
DRAWORDER	= <draworder>	AFTERDATA	
DRAWORDER	= <draworder>	AFTERDATA	
FILLCOLOR	= <color>		
ISFILLED	= <boolean>		
LINEPATTERN	= <linepattern>		
LINETHICKNESS	<op> <dexp>		
MACROFUNCTIONCOMMAND	= <string>		Set the macro command to execute when you hover over the geometry and press Ctrl-right-click.
MAINTAINASPECTRATIO	= <boolean>	YES	
NUMELLIPSEPTS	<op> <integer>		
PATTERNLENGTH	<op> <dexp>		
PIXELASPECTRATIO	= <double>	0	A value of 0 allows Tecplot 360 to select the aspect ratio.Use only if your circles or squares due to the aspect ratio of your monitor.
POSITIONCOORDSYS	= <coordsys>		
SCOPE	= <scope>		
ZONE	= <integer>		

Example: Make the default geometry line thickness 0.2 percent:

```
$!DEFAULTGEOM
LINETHICKNESS = 0.2
```

$!DEFAULTTEXT

Syntax: `$!DEFAULTTEXT`
`[optional parameters]`

Description: A SetValue command that sets the attributes for the default text. When text is added to a plot interactively, its font, color, size, and so forth, are based on the default text. This command is usually used only in the Tecplot 360 configuration file.

Optional Parameters

Parameter	Syntax	Default	Notes
ANCHOR	= <textanchor>		
ANCHORPOS	<<xy>>		
ANGLE	<op><dexp>		
ATTACHTOZONE	= <boolean>		
BOX	<<textbox>>		
CLIPPING	= <clipping>		
COLOR	= <color>		
LINESPACING	<op><dexp>		
MACROFUNCTION COMMAND	= <string>		Set the macro command to execute when you hover over the geometry and press Ctrl-right-click.
POSITIONCOORDSYS	= <coordsys>		
SCOPE	= <scope>		
TEXTSHAPE	<<textshape>>		
ZONE	<op><integer>		

Example: Make the default text font Times bold with a character height of 14 points:

```
$!DEFAULTTEXT
TEXTSHAPE
{
 FONTFAMILY = "Times"
 ISBOLD = YES
 ISITALIC = NO
 SIZEUNITS = POINT
 HEIGHT = 14
}
```

$!DELAY

Syntax: `$!DELAY <integer>`
`[no parameters]`

Description: Delay Tecplot 360 execution for <integer> seconds.

Example: Pause Tecplot 360 for 3 seconds:

```
$!DELAY 3
```

$!DELETEAUXDATA

Syntax: `$!DELETEAUXDATA`
`AUXDATALOCATION = [zone/var/dataset/frame/linemap|page]`
`[optional parameters]`

Description: Delete Auxiliary Data in the form of name/value pairs from zones, frames or datasets.

Required Parameters

Parameter	Syntax	Default	Notes
AUXDATALOCATION	= *[zone/var/ dataset/frame/ linemap|page]*		

Optional Parameters

Parameter	Syntax	Default	Notes
NAME	= <string>		
NUM	= <integer>		
VAR	= <integer>		
ZONE	= <integer>		Only required if **AUXDATALOCATION** = zone

Example: Delete the selected Auxiliary Data from Zone 2.:

```
$!DELETEAUXDATA
AUXDATALOCATION = zone
ZONE = 2
NAME = VARIABLE DATA
```

$!DELETELINEMAPS

Syntax: $!DELETEMAPS <set>
[no parameters]

Description: Delete one or more Line-mappings. If <set> is omitted then all Line-mappings are deleted.

Example: Delete Line-mappings 2, 3, 4 and 8:

```
$!DELETELINEMAPS [2-4,8]
```

$!DELETEVARS

Syntax: $!DELETEVARS <set>
[no parameters]

Description: Delete one or more variables.

Example: Delete variables 4 and 10:

```
$!DELETEVARS [4,10]
```

$!DELETEZONES

Syntax: $!DELETEZONES <set>
[no parameters]

Description: Delete one or more zones.

Example: Delete zones 3, 7, 8, 9 and 11:

```
$!DELETEZONES [3,7-9,11]
```

$!DOUBLEBUFFER *[Required-Control Option]*

Description: The different commands in the DOUBLEBUFFER compound function family are described separately in the following sections.

The DOUBLEBUFFER compound functions are:

```
$!DOUBLEBUFFER OFF
$!DOUBLEBUFFER ON
$!DOUBLEBUFFER SWAP
```

$!DOUBLEBUFFER OFF

Syntax: $!DOUBLEBUFFER OFF
[no parameters]

Description: Turn off double buffering; use this command once at the end of a sequence of using the double buffer.

Example: See $!DOUBLEBUFFER SWAP

$!DOUBLEBUFFER ON

Syntax: $!DOUBLEBUFFER ON
[no parameters]

Description: Turn on double buffering; use this command once at the beginning of a sequence of using the double buffer. While double buffering is turned on all drawing is sent to the back buffer.

Example: See $!DOUBLEBUFFER SWAP

$!DOUBLEBUFFER SWAP

Syntax: $!DOUBLEBUFFER SWAP
[no parameters]

Description: Swap the back buffer to the front. In other words, copy the image in the back buffer to the front.

Example:

The following example uses the double buffer to show the rotation of a 3-D object:

```
$!DOUBLEBUFFER ON
$!LOOP 10
$!ROTATE3DVIEW X
 ANGLE = 5
$!REDRAW
$!DOUBLEBUFFER SWAP
$!ENDLOOP
$!DOUBLEBUFFER OFF
```

$!DRAWGRAPHICS

Syntax: $!DRAWGRAPHICS <boolean>
[no parameters]

Description: Turn on or off all graphics drawing. Turning off all graphics during preliminary portions of a macro file can greatly increase the efficiency of the macro.

Example: Turn off all graphics drawing:

```
$!DRAWGRAPHICS NO
```

$!DROPDIALOG

Syntax: $!DROPDIALOG <dialogname>
[no parameters]

Description: Drop a Tecplot 360 interface dialog. This command is mainly useful for the Tecplot 360 demo. To launch a dialog use $!LAUNCHDIALOG.

Example:

```
$!DROPDIALOG MACROVIEWER
```

$!DUPLICATELINEMAP

Syntax: $!DUPLICATELINEMAP
SOURCEMAP = <integer>
DESTINATIONMAP = <integer>
[no optional parameters]

Description: Copy attributes from an existing Line-mapping to another.

Required Parameters

Parameter	Syntax	Default	Notes
DESTINATIONMAP	= <integer>		The destination can either be the number of an existing map or 1 greater than the current number of maps. If you choose the latter, a new Line-mapping will be created.
SOURCEMAP	= <integer>		Line-mapping from which to copy.

Example: Copy attributes of Line-mapping 3 to Line-mapping 7:

```
$!DUPLICATELINEMAP
SOURCEMAP      = 3
DESTINATIONMAP = 7
```

$!DUPLICATEZONE

Syntax: $!DUPLICATEZONE
SOURCEZONE = <integer>
[optional parameters]

Description: Make a copy of an existing zone. You can assign index ranges to create a new zone which is a subset of the source zone.

Required Parameter

Parameters	Syntax	Default	Notes
SOURCEZONE	= <integer>		Zone to duplicate (the source zone).

Optional Parameters

Parameters	Syntax	Default	Notes
IRANGE			See notes Range Parameters for $!ALTERDATA action command.
{			
MIN	= <integer>	1	
MAX	= <integer>	0	
SKIP	= <integer>	1	
}			
JRANGE			See notes Range Parameters for $!ALTERDATA action command.
{			
MIN	= <integer>	1	
MAX	= <integer>	0	
SKIP	= <integer>	1	
}			
KRANGE			See notes Range Parameters for $!ALTERDATA action command.
{			
MIN	= <integer>	1	
MAX	= <integer>	0	
SKIP	= <integer>	1	
}			

Examples:

Example 1:

Make a complete copy of zone 2:

```
$!DUPLICATEZONE
SOURCEZONE = 2
```

Example 2:

Duplicate zone 3 creating a zone which uses only the I-index range from 2 to 7 from the source zone:

```
$!DUPLICATEZONE
SOURCEZONE = 3
IRANGE
{
 MIN = 2
 MAX = 7
}
```

E

$!ELSE

Syntax: $!ELSE

[no parameters]

Description: Conditionally handle macro commands. Used when an $!IF statement is FALSE.

Example:

```
$!VARSET |C| = 2
$!IF |C| == 5
 $!CREATENEWFRAME
XYPOS
            {
            X = 2.5
            Y = 1.5
            }
            WIDTH = 4
            HEIGHT = 4
$!ELSE
 $!CREATENEWFRAME
            XYPOS
            {
            X = 3
            Y = 2
            }
            WIDTH = 3
            HEIGHT = 3
$!ENDIF
```

$!ELSEIF

Syntax: $!ELSEIF <conditionalexp>

Description: Conditionally handle macro commands. Used to create multiple options for statements should an $!IF statement be FALSE.

Example:

```
$!VARSET |A| = 2
$!IF |A| < 5
 $!CREATENEWFRAME
XYPOS
{
X = 1
Y = 1
}
WIDTH = 3
HEIGHT = 3
$!ELSEIF |A| > 5
 $!CREATENEWFRAME
XYPOS
{
X = 2
Y = 1
}
WIDTH = 5
HEIGHT = 5
$!ELSE
```

```
 $!CREATENEWFRAME
XYPOS
{
X = 3
Y = 3
}
WIDTH = 9
HEIGHT = 9
$!ENDIF
```

$!EXPORT

Syntax: `$!EXPORT`
`[no parameters]`

Description: Export an image file from Tecplot 360. See the $!EXPORTSETUP command for details on setting up the exported image type. The `$!EXPORT` command is not valid for animation formats.

Example:

```
 $!EXPORTSETUP EXPORTFORMAT = PNG
 $!EXPORT
```

$!EXPORTCANCEL

Syntax: `$!EXPORTCANCEL`
`[no parameters]`

Description: Cancel out of the current export animation sequence. The animation file being generated is removed.

Example:

```
 $!EXPORTCANCEL
```

$!EXPORTFINISH

Syntax: `$!EXPORTFINISH`
`[no parameters]`

Description: Signals the completion of an animation sequence and causes the animation file to be created. You must call `$!EXPORTSTART` prior to using `$!EXPORTFINISH`. This command is only valid for animation formats. You may use the `|EXPORTISRECORDING|` intrinsic variable to make sure that an animation sequence has been initiated.

Example:

```
 $!EXPORTSETUP
  EXPORTFNAME="rotate.avi"
  EXPORTFORMAT=AVI
 $!EXPORTSTART
 $!LOOP 5
 $!ROTATE3DVIEW X
  ANGLE=5
```

```
$!EXPORTNEXTFRAME
$!ENDLOOP
$!IF "|EXPORTISRECORDING|" =="YES"
   $!EXPORTFINISH
$!ENDIF
```

$!EXPORTNEXTFRAME

Syntax: `$!EXPORTNEXTFRAME`
`[no parameters]`

Description: Records the next frame of an animation. You must call `$!EXPORTSTART` prior to calling `$!EXPORTNEXTFRAME`. This command is only valid for animation formats. You may use the `|EXPORTISRECORDING|` intrinsic variable to make sure that an animation sequence has been initiated.)

Example:

```
$!EXPORTSETUP
 EXPORTFNAME="rotate.avi"
 EXPORTFORMAT=AVI
$!EXPORTSTART
$!LOOP 5
$!ROTATE3DVIEW X
 ANGLE=5
$!EXPORTNEXTFRAME
$!ENDLOOP
$!EXPORTFINISH
```

$!EXPORTSETUP

Syntax: `$!EXPORTSETUP`
`[optional parameters]`

Description: A SetValue command that sets the attributes for exporting image files from Tecplot 360. Exporting is usually intended as a means to transfer images from Tecplot 360 to be imported by other applications. See $!PRINTSETUP and $!PRINT for generating output intended for printers and plotters.

Optional Parameters

Parameter	Syntax	Default	Notes
ANIMATIONSPEED	= <double>	10	Sets the animation speed in frames per second.
AVICOMPRESSION	= <string>	COLOR PRESERVING	Available values are LINEPRESERVING, COLORPRESERVING (Windows only), or LOSSLESSUNCOMPRESSED
CONVERTTO256COLORS	= <boolean>	NO	Used for TIFF, BMP, and PNG formats.
EXPORTFNAME	= <string>		
EXPORTFORMAT	= <exportformat>	WINDOWS METAFILE	
EXPORTREGION	= <bitdumpregion>	CURRENTFRAME	
FLASHCOMPRESSIONTYPE	= <compressiontype>	SMALLESTSIZE	
FLASHIMAGETYPE	= <imagetype>	LOSSLESS	
IMAGEWIDTH	<op> <integer>	= 512	
JPEGENCODING	= *STANDARD or PROGRESSIVE*	STANDARD	
PRINTRENDERTYPE	= <printrendertype>	VECTOR	
QUALITY	= <integer>	75	Range is from 1-100
SUNRASTERFORMAT	= <sunrasterformat>	STANDARD	Only applies if EXPORTFORMAT is SUNRASTER®.
SUPERSAMPLEFACTOR	= <integer>	3	This is the factor used in antialiasing while reducing the size of an exported image. A larger size can improve the quality of the image, but slows performance.
TIFFBYTEORDER	= <tiffbyteorder>	INTEL	
USEMULTIPLECOLORTABLES	= <boolean>	NO	Applies to AVI and Raster Metafile only.
USESUPERSAMPLEANTIALIASING	= <boolean>	NO	

Example: Set up Tecplot 360 to export a Raster Metafile image to the file `movie.rm`:

```
$!EXPORTSETUP
EXPORTFNAME = "movie.rm"
EXPORTFORMAT = RASTERMETAFILE
```

$!EXPORTSTART

Syntax: `$!EXPORTSTART`
`[optional parameter]`

Description: Signals the start of an animation sequence and records the first frame of the animation. This command is only valid for animation formats.

Optional Parameters

Parameter	Syntax	Default	Notes
EXPORTREGION	= <bitdumpregion>		

Example:

```
$!EXPORTSETUP
 EXPORTFNAME="rotate.avi"
 EXPORTFORMAT=AVI
EXPORTREGION = CURRENTFRAME
```

```
$!EXPORTSTART
$!LOOP 5
$!ROTATE3DVIEW X
 ANGLE=5
$!EXPORTNEXTFRAME
$!ENDLOOP
$!EXPORTFINISH
```

$!EXTENDEDCOMMAND

Syntax: `$!EXTENDEDCOMMAND`
`COMMANDPROCESSORID = <string>`
`COMMAND = <string>`
`[optional parameters]`

Description: Send a command to an add-on. The add-on registers the name of a function that will be called when an `$!EXTENDEDCOMMAND` is processed. Tecplot 360 knows which registered function to call based on the `COMMANDPROCESSORID` string. See the function `TecUtilMacroExtCommandCallback` in the ADK Reference Manual.

Required Parameters

Parameter	Syntax	Default	Notes
COMMANDPROCESSORID	= <string>		String that identifies the add-on. This must match the published ID string for the add-on.
COMMAND	= <string>		The command to be sent to the add-on.

Optional Parameters

Parameter	Syntax	Default	Notes
<extendedcommandrawdata>		NULL	If the RAWDATA section is supplied then each line of the RAWDATA section is appended to the COMMAND string. A leading new line character is appended first, and each line in the RAWDATA section will also be terminated with a new line (except for the last line).

Example:

Send the command `GO` to the add-on that has registered a command processor with an `COMMANDPROCESSORID` of `XPROC`:

```
$!EXTENDEDCOMMAND
  COMMANDPROCESSORID = "XPROC"
  COMMAND = "GO"
```

$!EXTRACTFROMGEOM

Syntax: `$!EXTRACTFROMGEOM`
`[optional parameters]`

Description: Extract data from a 2- or 3D field plot. The locations at which to extract the data come from a polyline geometry that must be picked prior to issuing this command.

Optional Parameters

Parameters	Syntax	Default	Notes
EXTRACTLINEPOINTS ONLY	= <boolean>	NO	If NO, must include NUMPTS.
EXTRACTTOFILE	= <boolean>	NO	If NO, a zone is created. If YES, must include FNAME.
FNAME	= <string>		File name for extracted file. Required if EXTRACTTOFILE is YES.
INCLUDEDISTANCE VAR	= <boolean>	NO	If YES, then Tecplot 360 includes an extra variable in the result which is the distance along the line of points extracted and EXTRACTTOFILE must also be YES.
NUMPTS	= <integer>		Required if EXTRACTLINEPOINTSONLY is NO.

Example:

Extract 20 points from along the currently picked geometry. Send the result to a file called *extract.dat*:

```
$!EXTRACTFROMGEOM
NUMPTS = 20
EXTRACTTOFILE = YES
FNAME = "extract.dat"
```

$!EXTRACTFROMPOLYLINE

Syntax: `$!EXTRACTFROMPOLYLINE`
`[optional parameters]`
<xyrawdata>

Description: Extract data from a 2- or 3D field plot. The locations of where to extract the data from come from a supplied polyline in the form of <xyzrawdata>.

Optional Parameters

Parameters	Syntax	Default	Notes
EXTRACTLINEPOINTS ONLY	= <boolean>	NO	If NO, must include NUMPTS.
EXTRACTTHROUGH VOLUME	= <boolean>	NO	If YES, data is extracted from XYZ-coordinates in the polyline. If NO, data is extracted from the surface.
EXTRACTTOFILE	= <boolean>	NO	If NO, a zone is created. If YES, you must include FNAME.
FNAME	= <string>		File name for extracted file. Required if EXTRACTTOFILE is YES.
INCLUDEDISTANCE VAR	= <boolean>	NO	If YES, Tecplot 360 includes an extra variable in the result which is the distance along the line of points extracted and EXTRACTOFILE must also be YES.
NUMPTS	= <integer>		Required if EXTRACTLINEPOINTSONLY is NO.

Example:

Extract 10 points from specific locations in a field plot. Create a zone with the extracted data:

```
$!EXTRACTFROMPOLYLINE
EXTRACTLINEPOINTSONLY = YES
RAWDATA
10
0 0 0
1 2 0
2 4 0
3 2 0
3 4 0
```

```
4 4 0
4 5 0
4 6 0
5 7 0
6 9 0
```

F

$!FIELDLAYERS

Syntax: `$!FIELDLAYERS`
`[optional parameters]`

Description: A SetValue command that turns field plot layers on or off, or sets the 2D draw order.

Optional Parameters

Parameter	Syntax	Default	Notes
SHOWCONTOUR	= <boolean>	NO	
SHOWEDGE	= <boolean>	YES	
SHOWISOSURFACES	= <boolean>	NO	
SHOWMESH	= <boolean>	NO	
SHOWSCATTER	= <boolean>	NO	
SHOWSHADE	= <boolean>	YES	
SHOWSLICES	= <boolean>	NO	
SHOWVECTOR	= <boolean>	NO	Vector variables must be defined. See $!GLOBALTWODVECTOR or $!GLOBALTHREEDVECTOR.
TWODDRAWORDER	= <twoddraworder>	BYLAYER	
USELIGHTINGEFFECT	= <boolean>	YES	
USETRANSLUCENCY	= <boolean>	YES	

Example: Turn on the scatter layer:

```
$!FIELDLAYERS
SHOWSCATTER = YES
```

$!FIELDMAP

Syntax: `$!FIELDMAP` *[<set>]*
`[optional parameters]`

Description: A SetValue command that assigns zone attributes for field plots. The <set> parameter immediately following the `$!FIELDMAP` command is optional. If <set> is omitted then the assignment is applied to all zones. Otherwise the assignment is applied only to the zones specified in <set>.

Optional Parameters

Parameter	Syntax	Default	Notes
CONTOUR			
{			
COLOR	= <color>	BLACK	
CONTOURTYPE	= <contourtype>	FLOOD	
FLOODCOLORING	= <contourcoloring>	GROUP1	
LINECONTOURGROUP	= <integer>	1	
LINEPATTERN	= <linepattern>	SOLID	
LINETHICKNESS	<op> <dexp>	= 0.1	
PATTERNLENGTH	<op> <dexp>	= 2	
SHOW	= <boolean>	YES	
USELIGHTINGEFFECT	= <boolean>	YES	
}			
EDGELAYER			
{			
COLOR	= <color>	BLACK	
EDGETYPE	= <edgetype>	BORDERSAND CREASES	
IEDGE	= <borderlocation>	BOTH	Applies for IJ-, IK-, and IJK-ordered zones.
JEDGE	= <borderlocation>	BOTH	Applies for IJ-, IK-, and IJK-ordered zones.
KEDGE	= <borderlocation>	BOTH	Applies for IJ-, IK-, and IJK-ordered zones.
LINETHICKNESS	= <dexp>	0.1	
SHOW	= <boolean>	YES	
USEBLANKING	= <boolean>		
}			
EFFECTS			
{			
LIGHTINGEFFECT	= <lightingeffect>	GOURAUD	
SURFACETRANSLUCENCY	<translucency>	50	SURFACETRANSLUCENCY range is one to 99.
USETRANSLUCENCY	= <boolean>	YES	
USEVALUEBLANKING	= <boolean>	YES	Set to YES to include value blanking in the specified zones
USECLIPPLANES	= <set>	[1-6]	Use clipping planes specified to clip zones specified in set for FIELDMAP, or all zones if none specified. Possible values include [ ] (none), or any combination of the numbers 1 - 6, enclosed in brackets.
}			
MESH			
{			
COLOR	= <color>	BLACK	
LINEPATTERN	= <linepattern>	SOLID	
LINETHICKNESS	<op> <dexp>	= 0.1	
MESHTYPE	= <meshtype>	OVERLAY	
PATTERNLENGTH	<op> <dexp>	= 2	
SHOW	= <boolean>	YES	
}			
POINTS			
{			
IJKSKIP	<<ijk>>	I = 1, J = 1, K = 1	Limits the number of vectors or scatter symbols drawn.

Parameter	Syntax	Default	Notes
POINTSTOPLOT	<pointstoplot>	SURFACENODES	
}			
SCATTER			
{			
COLOR	= <color>	BLACK	
FILLCOLOR	= <color>	WHITE	
FILLMODE	= <fillmode>	NONE	
FRAMESIZE	<op> <dexp>	2.5	Size of symbols when SIZEBYVARIABLE is NO.
LINETHICKNESS	<op> <dexp>	0.1	
SHOW	= <boolean>	YES	
SIZEBYVARIABLE	= <boolean>	NO	Scatter sizing variable must be defined before this can be set to YES. See the $!GLOBALSCATTER command.
SYMBOLSHAPE	<<symbolshape>>	See Notes	ISASCII = NO, GEOMSHAPE = SQUARE
}			
SHADE			
{			
COLOR	= <color>	WHITE	
SHOW	= <boolean>	YES	
USELIGHTINGEFFECT	= <boolean>	YES	
}			
SURFACES			
{			
IRANGE	<<indexrange>>	See Notes	MIN=1, Max=0, Skip=1
JRANGE	<<indexrange>>	See Notes	MIN=1, Max=1, Skip=1
KRANGE	<<indexrange>>	See Notes	MIN=1, Max=1, Skip=1
SURFACESTOPLOT	= <surfacestoplot>	NONE	
}			
VECTOR			
{			
ARROWHEADSTYLE	<arrowheadstyle>	PLAIN	
COLOR	= <color>	BLACK	
ISTANGENT	= <boolean>	NO	
LINEPATTERN	= <linepattern>	SOLID	
LINETHICKNESS	= <dexp>	0.1	
PATTERNLENGTH	= <dexp>	2	
SHOW	= <boolean>	YES	
VECTORTYPE	= <vectortype>	TAILATPOINT	
}			
VOLUMEMODE			VOLUMEMODE applies to volume zones, with the exception that POINTSTOPLOT also applies to finite-element surface zones.
{			
VOLUMEOBJECTSTOPLOT	<<volumeobjectstoplot>>	SHOWISOSURFACES=YES, SHOWSLICES=YES, SHOWSTREAMTRACES=YES	
}			
GROUP	= <integer>	1	Assign a group number to the supplied set of zones.

Examples:

Example 1:

Change the contour plot type to flood for zones 1-12:

```
$!FIELDMAP [1-12]
CONTOUR
{
 CONTOURTYPE = FLOOD
}
```

Example 2:

Change the mesh color to red for all zones (default mesh color is black):

```
$!FIELDMAP
MESH
{
 COLOR = RED
}
```

$!FILECONFIG

Syntax: `$!FILECONFIG`
`[optional parameters]`

Description: A SetValue command that sets file path information in Tecplot 360.

Optional Parameters

Parameter	Syntax	Default	Notes
ADDZONESTOEXISTINGSTRANDS	= <boolean>	NO	If YES, Tecplot 360 will add the zones from the appended data to any existing strands in the dataset. If NO, Tecplot 360 will append the strands from the new data to any existing strands in the dataset.
ASSIGNSTRANDID	= <boolean>	YES	If YES, Tecplot 360 will assign strand ID's to zones (if time is supplied for the zones but not strand ID's). If NO, Tecplot 360 will not associate these zones with any strands.
DATAFILEVARLOADMODE	= <varloadmode>	BYNAME	Set the default loading mode for variables. BYNAME loads variables based on their name. If set to BYNAME, then VARNAMELIST must be supplied as well. BYPOSITION loads variables based on their position in the file. To get Tecplot Version 7.0 behavior, use BYPOSITION.
DOAUTOFNAMEEXTENSION	= <boolean>		
DOAUTOFNAMEEXTENSIONWARNING	= <boolean>		If YES a warning is displayed when attempting to save with an extension other than the default extension.
FNAMEFILTER {			
COLORMAPFILE	= <string>		Default extension for color map files.
EQUATIONFILE	= <string>		Default extension for equation files.
IMPORTIMAGEFILE	= <string>		Default extension for image files.
INPUTDATAFILE	= <string>		Default extension for Tecplot 360 input data files.
INPUTLAYOUTFILE	= <string>		Default extension for loading layout files.
MACROFILE	= <string>		Default extension for macro files.
OUTPUTASCIIDATAFILE	= <string>		Default extension for ASCII output data files.
OUTPUTBINARYDATAFILE	= <string>		Default extension for binary output data files.
OUTPUTLAYOUTFILE	= <string>		Default extension for saving linked layout files.
OUTPUTLAYOUTPACKAGEFILE	= <string>		Default extension for saving layout package files.
STYLEFILE	= <string>		Default extension for style files.
}			
LAYOUTCONFIG {			
INCLUDEDATA	= <boolean>	NO	If YES, layout packages are the default format for layouts
INCLUDEPREVIEW	= <boolean>	NO	If YES, preview images are saved with layout packages.
USERELATIVEPATHS	= <boolean>	YES	If YES, files will be referenced using relative paths in layout files.
}			
LOADONDEMAND {			
ALLOW	= <boolean>	YES	If YES, Tecplot 360 will use it's load-on-demand features for loading and unloading variables.

Parameter	Syntax	Default	Notes
DATASTORESTATEGY	= <dataloadstrategy>	AUTO	Set the data store strategy for load-on-demand. If set to AUTO, Tecplot 360 will use store large allocations in the temporary directory and use memory mapped I/O to read and write to the regions when possible otherwise it will use the memory heap (usually this provides better performance for large data). If set to HEAP Tecplot 360 will not use the temporary directory for large allocations (this option is usually slower when working with large data).
UNLOADSTRATEGY } }	= <unloadstrategy>	AUTO	Set the unload strategy for load-on-demand. If set to AUTO Tecplot 360 will unload unused variables when the amount needed RAM begins to reach the maximum amount of RAM. If set to NEVERUNLOAD Tecplot 360 will load variables on demand but will never attempt to unload them even if it is running low on memory. If set to MINIMIZEMEMORYUSE Tecplot 360 will aggressively unload variables as soon as they are not needed regardless of the amount of memory available or in use.
TEMPFILEPATH	= <string>		Set the directory where you want Tecplot 360 to store its temporary files.

File Name Filters: Valid characters are upper or lowercase A-Z, and 0-9. Each filter should be preceded by (*), or it will not filter properly. On Windows® operating systems, to allow more than one extension, separate them with a semicolon (;). On UNIX® platforms multiple extensions will not filter correctly unless they follow the standard UNIX shell filter format.

Windows Example: This example filters all four extensions when opening a layout file.

```
$!FILECONFIG FNAMEFILTER {INPUTLAYOUTFILE =                "*.wsf;*.dwr;*.lay;*.lpk"}
```

Windows Example: This example filters both extensions when writing a layout file. The default extension is **.wsf** because it is the first extension presented in the list.

```
$!FILECONFIG FNAMEFILTER {OUPUTLAYOUTFILE = ".wsf;*.lay"}
```

Motif® Example: This example filters .aek, .plt, and more.

```
$!FILECONFIG FNAMEFILTER {INPUTDATAFILE = "*.[ae][el][kt]"}
```

Motif Example: This example filters .dat, .cam, and more. The default extension is .dat because D and T are the first letters presented within the brackets.

```
$!FILECONFIG FNAMEFILTER {OUTPUTASCIIDATAFILE =              "*.[dc]a[tm]"}
```

Example: Set the directory where Tecplot 360 stores temporary files to be /usr/tmp:

```
$!FILECONFIG
DATAFILEVARLOADMODE = BYPOSITION
   TEMPFILEPATH = "/usr/tmp"
   LAYOUTCONFIG {USERELATIVEPATHS = YES}
   FNAMEFILTER
      {
      INPUTDATAFILE = "*.[pd][la]t"
      COLORMAPFILE = "*.clr"
      }
```

$!FONTADJUST

Syntax: `$!FONTADJUST`
`[optional parameters]`

Description: A SetValue command that sets character spacing and sizing for fonts in Tecplot 360. These parameters rarely change.

Optional Parameters

Parameter	Syntax	Default	Notes
BOLDFACTOR	<op> <double>		Thickness of bold characters relative to normal.
INTERCHARSPACING	<op> <integer>		Increase or decrease inter-character spacing. Units are in pixels on the screen.
STROKEFONTLINE THICKNESS	<op> <double>		Thickness (in frame units) of lines used to draw stroke fonts.
SUBSUPFRACTION	<op> <double>		Size of subscript and superscript characters relative to the font height.

Example: Make superscript and subscript characters 1/3 the font height:

```
$!FONTADJUST
SUBSUPFRACTION = 0.333
```

$!FOURIERTRANSFORM

Syntax: `$!FOURIERTRANSFORM`
`INDEPENDENTVAR = <integer>`
`WINDOWFUNCTION = <windowfunction>`
`DEPENDENTVARS = <set>`
`SOURCEZONES = <set>`
`INCLUDECONJUGATES = <boolean>`
`OBEYSOURCEZONEBLANKING = <boolean>`
`[no optional parameters]`

Description: Performs a Fourier transform for each dependent variable for each source zone. A new zone containing the resulting frequency, amplitude, and phase variables (three for each dependent variable) is created for each source zone. If the independent variable is non-uniform, the resulting frequency is a modification of the original data (see discussion below for the INDEPENDENTVAR and OBEYSOURCEZONEBLANKING parameters). Resulting zones are assigned new time strands using the same groupings as the source zones if they belong to time stands; otherwise, the resulting zones are static.

Fourier transform result zones are named "Fourier Transform" followed by a mixture of text indicating the source zone, independent variable, and window function used. Similarly, the three variables created are given the names "Frequency", "Amplitude", and "Phase" followed by the dependent variable used. Newly-created zones are assigned passive variables for all variables that previously existed in the data set, and all previously-existing zones are assigned passive variables for all new variables created by the Fourier transform.

Required Parameters

Parameter	Syntax	Notes
INDEPENDENTVAR	= <integer>	Independent variable used for the frequency domain. If the spacing is non-uniform, this variable is used in conjunction with each dependent variable for interpolation to create a uniform frequency domain for the transform.
WINDOWFUNCTION	= <windowfunction>	Window function or tapering function applied to the dependent variables before performing the transform but after performing the non-uniform interpolation. For details, see http://en.wikipedia.org/wiki/Window_function
DEPENDENTVARS	= <set>	Set of dependent variables on which to perform a Fourier transform. The variables must not be the same as the independent variable. This must not be NULL or an empty set and must be a subset of the variables in the source zones.
SOURCEZONES	= <set>	Set of source zones containing the dependent variables on which to perform the Fourier transform. This must not be NULL or an empty set and must be a subset of the data set's available zones.
INCLUDECONJUGATES	= <boolean>	For purely real numbers, the Fourier transform output satisfies the " Hermitian" redundancy where out[i] is the conjugate of out[n-i]. If this parameter is YES, the conjugates are included, otherwise they are not, and approximately half of the output values, n/2+1, are computed.
OBEYSOURCEZONEBLANKING	= <boolean>	If value blanking is active and this value is YES, value blanking is applied to the data values of both the independent and dependent variables before the data is interpolated for non-uniformity. If data values eliminated from the independent or dependent variables cause the data to be non-uniform the values are interpolated appropriately. Additionally, all blanked data values up to the first non-blanked data value and all blanked data values after the last non-blanked data value are ignored, providing a mechanism to constrain the domain over which the Fourier transformation is performed.

Optional Parameters

Parameter	Syntax	Default	Notes
REPLACEMATCHINGRESULTZONES	= <boolean>	NO	If YES, any existing result zones for the specified combination of source zone, independent variable, and window function are re-used. If NO, new result zones are created.
REPLACEMATCHINGRESULTVARIABLES	= <boolean>	NO	If YES, any existing result variables for the specified dependent variables are re-used. If NO, new result variables are created.

Example: Perform a Fourier transform on variables 2 through 11 of zones 1 through 10 obeying source zone blanking, applying the Hann window function and excluding conjugates from the output.

```
$!FOURIERTRANSFORM
INDEPENDENTVAR = 1
WINDOWFUNCTION = HANN
DEPENDENTVARS = [2-11]
SOURCEZONES = [1-10]
INCLUDECONJUGATES = NO
OBEYSOURCEZONEBLANKING = YES
```

$!FRAMECONTROL *[Required Control Option]*

Description: The different commands in the FRAMECONTROL compound function family are described separately in the following sections. When working with the FRAMECONTROL commands, it may help to realize that a command containing "Activate" changes the active frame; a command containing "MoveTo" changes the frame drawing order.

The FRAMECONTROL compound functions following are:

```
$!FRAMECONTROL ActivateTop
$!FRAMECONTROL ActivateNext
```

```
$!FRAMECONTROL ActivatePrevious
$!FRAMECONTROL ActivateAtPosition
$!FRAMECONTROL ActivateByName
$!FRAMECONTROL ActivateByNumber
$!FRAMECONTROL MoveToTopActive
$!FRAMECONTROL MoveToTopByName
$!FRAMECONTROL MoveToTopByNumber
$!FRAMECONTROL MoveToBottomActive
$!FRAMECONTROL MoveToBottomByName
$!FRAMECONTROL MoveToBottomByNumber
$!FRAMECONTROL DeleteActive
$!FRAMECONTROL FitAllToPaper
```

$!FRAMECONTROL ACTIVATETOP

Syntax: `$!FRAMECONTROL ACTIVATETOP`
`[no parameters]`

Description: Changes the active frame to the frame that is topmost in the frame drawing order.

Example:

```
$!FRAMECONTROL ACTIVATETOP
```

$!FRAMECONTROL ACTIVATENEXT

Syntax: `$!FRAMECONTROL ACTIVATENEXT`
`[no parameters]`

Description: Changes the active frame to the next one up in the frame drawing order, or to the bottom frame if the active frame is at the top.

Example:

```
$!FRAMECONTROL ACTIVATENEXT
```

$!FRAMECONTROL ACTIVATEPREVIOUS

Syntax: `$!FRAMECONTROL ACTIVATEPREVIOUS`
`[no parameters]`

Description: Changes the active frame to the next one down in the frame drawing order, or to the top frame if the active frame is at the bottom.

Example:

```
$!FRAMECONTROL ACTIVATEPREVIOUS
```

$!FRAMECONTROL ACTIVATEATPOSITION

Syntax: `$!FRAMECONTROL ACTIVATEATPOSITION`
X = <xpos> Y = <ypos>

Description: Activates the topmost frame at the specified position. X and Y are in paper coordinates.

Required Parameters

Parameter	Syntax	Default	Notes
xpos	= <dexp>		Specify X-coordinate of position.
ypos	= <dexp>		Specify Y-coordinate of position.

Example:

```
$!FRAMECONTROL ACTIVATEATPOSITION X=0 Y=0
```

$!FRAMECONTROL ACTIVATEBYNAME

Syntax: `$!FRAMECONTROL ACTIVATEBYNAME`
`Name = <name>`

Description: Changes the active frame to the specified frame. If no frame name is given, this will activate the bottom frame.

Required Parameter

Parameter	Syntax	Default	Notes
Name	= <string>		Specify name of the frame to activate.

Example: Activate a frame named Topography.

```
$!FRAMECONTROL ACTIVATEBYNAME NAME="Topography"
```

$!FRAMECONTROL ACTIVATEBYNUMBER

Syntax: `$!FRAMECONTROL ACTIVATEBYNUMBER`
`Frame = <number>`

Description: Changes the active frame to the specified frame.

Required Parameter

Parameter	Syntax	Default	Notes
Frame	= <integer>	1	Specify number of the frame to activate.

Example: Activate Frame 4.

```
$!FRAMECONTROL ACTIVATEBYNUMBER FRAME=4
```

$!FRAMECONTROL MOVETOTOPACTIVE

Syntax: `$!FRAMECONTROL MOVETOTOPACTIVE`
`[no parameters]`

Description: Moves the active frame to the top of the drawing order.

Example:

```
$!FRAMECONTROL MOVETOTOPACTIVE
```

$!FRAMECONTROL MOVETOTOPBYNAME

Syntax: `$!FRAMECONTROL MOVETOTOPBYNAME`
`NAME=<name>`

Description: Moves the frame specified by name to the top of the frame drawing order.

Required Parameter

Parameter	Syntax	Default	Notes
Name	= <string>		Specify name of the frame to move to the top of the drawing order.

Example: Moves the frame named Topography to the top of the drawing order.

```
$!FRAMECONTROL MOVETOTOPBYNAME NAME="TOPOGRAPHY"
```

$!FRAMECONTROL MOVETOTOPBYNUMBER

Syntax: `$!FRAMECONTROL MOVETOTOPBYNUMBER`
`FRAME=<number>`

Description: Moves the frame specified by number to the top of the frame drawing order. If no frame number is specified, this command will move the bottom frame to the top of the frame drawing order.

Required Parameter

Parameter	Syntax	Default	Notes
Frame	= <integer>		Specify number of the frame to move to the top of the drawing order.

Example: Moves frame 4 to the top of the drawing order.

```
$!FRAMECONTROL MOVETOTOPBYNUMBER FRAME=4
```

$!FRAMECONTROL MOVETOBOTTOMACTIVE

Syntax: `$!FRAMECONTROL MOVETOBOTTOMACTIVE`
`[no parameters]`

Description: Moves the active frame to the top of the frame drawing order.

Example:

```
$!FRAMECONTROL MOVETOBOTTOMACTIVE
```

$!FRAMECONTROL MOVETOBOTTOMBYNAME

Syntax: `$!FRAMECONTROL MOVETOBOTTOMBYNAME`
`FRAME=<name>`

Description: Moves the frame specified by name to the bottom of the frame drawing order.

Required Parameter

Parameter	Syntax	Default	Notes
Name	= <string>		Specify name of the frame to move to the bottom.

Example:

```
$!FRAMECONTROL MOVETOBOTTOMBYNAME NAME=<name>
```

$!FRAMECONTROL MOVETOBOTTOMBYNUMBER

Syntax: `$!FRAMECONTROL MOVETOBOTTOMBYNUMBER`
`FRAME=<number>`

Description: Moves the frame specified by number to the bottom of the frame drawing order.

Required Parameter

Parameter	Syntax	Default	Notes
Frame	= <integer>		Specify number of the frame to move to the bottom.

Example: Move Frame 003 to the bottom.

```
$!FRAMECONTROL MOVETOBOTTOMBYNUMBER FRAME=003
```

$!FRAMECONTROL DELETEACTIVE

Syntax: `$!FRAMECONTROL DELETEACTIVE`
`[no parameters]`

Description: Delete the active frame.

Example:

```
$!FRAMECONTROL DELETEACTIVE
```

$!FRAMECONTROL FITALLTOPAPER

Syntax: `$!FRAMECONTROL FITALLTOPAPER`
`[no parameters]`

Description: Resize all frames so that they fit inside the hardclip limits of the paper.

Example:

```
$!FRAMECONTROL FITALLTOPAPER
```

$!FRAMELAYOUT

Syntax: `$!FRAMELAYOUT`
`[optional parameters]`

Description: A SetValue command that sets the position, border, and background attributes for the active

frame. Use the $!FRAMECONTROL action command to push and pop frames if you want to change the settings for a frame other than the active frame.

Optional Parameters

Parameter	Syntax	Default	Notes
BACKGROUNDCOLOR	= <color>	WHITE	Only applies if ISTRANSPARENT = NO.
BORDERTHICKNESS	<op> <dexp>	= 0.1	Value is in Y-frame units.
FRAMESIZEPOSUNITS	= <framecoordmode>		Whether frame sizes and positions are in absolute units (paper) or relative screen units from 0 to 1 (workspace)
HEADERCOLOR	= <color>	RED	Only applies if SHOWHEADER = YES.
HEADERFONTAMILY	= <string>	"Helvetica"	
HEIGHT	<op> <dexp>	= 8	Value is in inches.
HEADERFONTISBOLD	= <boolean>	YES	
HEADERFONTIS ITALIC	= <boolean>	NO	
ISTRANSPARENT	= <boolean>	NO	
SHOWBORDER	= <boolean>	YES	
SHOWHEADER	= <boolean>	NO	
WIDTH	<op> <dexp>	= 9	Value is in inches.
XYPOS	<<xy>>	X=1, Y=0.25	Position of upper left corner of the frame in inches from left and top edge of the paper.

Example:

Place the active frame in the upper left corner of the paper (offset 0.5 inches from the top and left edges), make the frame dimensions 3 by 4 inches, and turn off the frame border:

```
$!FRAMELAYOUT
SHOWBORDER = NO
XYPOS
{
 X = 0.5
 Y = 0.5
}
WIDTH = 3
HEIGHT = 4
```

$!FRAMENAME

Syntax: $!FRAMENAME = <string>
[no parameters]

Description: Set the name for the active frame (Default = "Frame001").

Example:

```
$!FRAMENAME = "Pressure Contours for well 33"
```

$!FRAMESETUP

Syntax: $!FRAMESETUP
[optional parameters]

Description: A SetValue command that sets parameters used to preset dynamic frame attributes when a frame is initialized.

Optional Parameters

Parameter	Syntax	Default	Notes
ALIGNINGCONTOUR LABELS	= <boolean>	YES	If YES, the next interactively placed contour label is aligned to the contour line.
ASSIGNSEQUENCED ZONECOLORS	= <boolean>	NO	If set to YES, the values set via $!FIELDMAP [nnn] MESHLAYER {COLOR = <color>} are used for default zone mesh colors (similarly for Edge colors).
FITINITIALFRAMETO WORKSPACE	= <boolean>	YES	If set to NO, the new layout is shown as in V10 with the entire paper fit to the work area. If set to YES, the new layout is shown with the active frame fit to the work area. This command changes the behavior of Tecplot 360 as it first appears during a session and as it appears after a new layout command. It has no effect on the current plot, but it can be used in a macro to set the value for future new plots. It is typically found in the *tecplot.cfg* file.
INITIAL3DFITTO SURFACES	= <boolean>	YES	If YES, initial 3D plot shows a view equivalent to using "$!View FitSurfaces" or the View->Fit Surface menu item, and ignores the "$!FrameSetup Initial3DScale" parameter. If NO, initial 3D plot is equivalent to using the value of "$!FrameSetup Initial3DScale" in the View->Translate/Magnify dialog or using the "$!View Scale=<double>" command. This value defaults to YES for 360 and NO for Focus.
INITIAL3DSCALE	<op> <dexp>	= 1.1	Initial scale for 3D plots.
NUMSTREAMRAKE POINTS	<op> <integer>	= 10	Number of points to place along streamtrace rakes.
NUMSTREAMSURFACE POINTS	<op> <integer>	= 1	Number of points to place when seeding streamtraces on surfaces.
RODRIBBONDEFLEN	<op> <dexp>	= 0.06	Default width (in frame units) of a streamtrace or ribbon
SHOWAPPENDEDZONES	= <boolean>	YES	If set to NO, zones added via an append data operation will be turned off initially.
SHOWNONWALL BOUNDARYZONES	= <boolean>	NO	If set to YES, any new zone that has a non-wall BOUNDARYCONDITION defined will be turned off initially.
VECTDEFLEN	<op> <dexp>	= 0.06	When a vector plot is drawn for the first time the vector magnitude is adjusted so the longest vector is VECTDEFLEN units long. VECDEFLEN is in frame units.
VECTMINLEN	<op> <dexp>	= 0.0005	Minimum length in centimeters. Vectors shorter than this length are not drawn.
USECOMMON SORTSTACK		YES	
DEFAULT2D STREAMTRACESTREAM DIRECTION		BOTH	
DEFAULT3D STREAMTRACESTREAM DIRECTION		BOTH	

Example: Make the default length for the longest vector five percent:

```
$!FRAMESETUP
VECTDEFLEN = 5
```

G

$!GETAUXDATA

Syntax: $!GETAUXDATA <macrovar>
AUXDATALOCATION = *[zone/var/dataset/frame/linemap|page]*
NAME = <string>
[optional parameters]

Description: Retrieve Auxiliary Data in the form of name/value pairs and save it to the macro variable.

Required Parameters

Parameter	Syntax	Default	Notes
AUXDATALOCATION	= *[zone/var/ dataset/frame/ linemap|page]*		
NAME	= <string>		Name of existing auxiliary data

Optional Parameters

Parameter	Syntax	Default	Notes
MAP	= <integer>		Only required if AUXDATALOCATION = linemap
VAR	= <integer>		Only required if AUXDATALOCATION = var
ZONE	= <integer>		Only required if AUXDATALOCATION = zone

Example: Get the Auxiliary Data from Zone 2, and store it in the macro variable |ABC|:

```
$!GETAUXDATA |ABC|
AUXDATALOCATION = zone
NAME = 'ABC.Aux.Data'
ZONE = 2
```

$!GETCONNECTIVITYREFCOUNT

Syntax: $!GETCONNECTIVITYREFCOUNT <macrovar>
ZONE = <integer>
[no optional parameters]

Description: Fetch the count of how many zones share connectivity with the specified zone. Count includes specified zone.

Required Parameters

Parameter	Syntax	Default	Notes
ZONE	= <integer>		

Example:

Fetch the connectivity count from Zone 2, and store it in the macro variable |ABC|. If zones 2, 5 and 6 share connectivity, |ABC| = 3.:

```
$!GETCONNECTIVITYREFCOUNT |ABC|
ZONE = 2
```

$!GETCURFRAMENAME

Syntax: $!GETCURFRAMENAME <macrovar>
[no parameters]

Description: Query Tecplot 360 for the name of the active frame. The <macrovar> represents the macro variable to receive the results.

Example: Put the name of the active frame into the macro variable |CFRAME|.

```
$!GETCURFRAMENAME |CFRAME|
```

$!GETFIELDVALUE

Syntax: $!GETFIELDVALUE <macrovar>
ZONE = <integer>
VAR = <integer>
INDEX = <integer>

Description: Fetch the field value (data set value) at the specified point index and assign the value to <macrovar>. If the zone referenced is IJ- or IJK-ordered, then the point index is calculated by treating the 2- or 3Dimensional array as a 1-D array.

Required Parameters

Parameter	Syntax	Default	Notes
INDEX	=<integer>		
VAR	=<integer>		
ZONE	=<integer>		

Example:

A data set contains 2 zones and 3 variables. Zone 2 is dimensioned 5 by 3. Fetch the value from variable 3 at IJ-location (2, 2), and store it in the macro variable |ABC|:

```
$!GETFIELDVALUE |ABC|
ZONE = 2
VAR   = 3
INDEX = 7
```

Note: INDEX was calculated using:

```
INDEX = I + (J-1)*|MAXI| + (K-1) * |MAXI| * |MAXJ|
            = 5*(2-1)+2
             = 7
```

$!GETFIELDVALUEREFCOUNT

Syntax: $!GETFIELDVALUEREFCOUNT <macrovar>
ZONE = <integer>
VAR = <integer>
[no optional parameters]

Description: Get the count of how many zones share the indicated variable with the specified zone. Count includes the specified zone.

Required Parameters

Parameter	Syntax	Default	Notes
VAR	= <integer>		
ZONE	= <integer>		

Example:

A data set contains 5 zones and 3 variables. Zones 1, 2 and 4 share variable 3, and zones 3 and 5 share variable 3.

```
$!GETFIELDVALUEREFCOUNT |ABC|
ZONE = 2
VAR   = 3
```

This returns |ABC| = 3, while

```
$!GETFIELDVALUEREFCOUNT |DEF|
ZONE = 5
VAR   = 3
```

returns |DEF| = 2 because the variable is not shared across all five zones.

$!GETNODEINDEX

Syntax:
```
$!GETNODEINDEX = <macrovar>
ZONE = <integer>
ELEMENT = <integer>
CORNER = <integer>
[no optional parameters]
```

Description: This function only works for finite-element zones. Query for the node index in the specified location as described by the ZONE, ELEMENT, and CORNER parameters.

Required Parameter

Parameter	Syntax	Default	Notes
ZONE	= <integer>		Zone must be greater than or equal to one.
CORNER	= <integer>		Possible values are 1-3, 1-4, or 1-8, depending upon the element type.
ELEMENT	= <integer>		Must be greater than or equal to one and less than or equal to |MAXJ|.

Example: Get the index for the node at corner 3 of the last element in zone number 1.

```
$!GETZONETYPE |ZONETYPE|
ZONE = 1
$!IF "|ZONETYPE|" = "FE BRICK"
$!GETNODEINDEX |INDEX|
   ZONE = 1
   ELEMENT = |MAXJ|
CORNER = 3
... Do something with |INDEX|...
$!ENDIF
```

$!GETVARLOCATION

Syntax: $!GETVARLOCATION <macrovar>
ZONE = <integer>
VAR = <integer>

Description: Returns the location of the variable in the zone as either CELLCENTERED or NODAL and saves in the macro variable.

Required Parameter

Parameter	Syntax	Default	Notes
VAR	= <integer>		
ZONE	= <integer>		

Example: Get the variable location for the third variable in zone 1.

```
$!GETVARLOCATION |ABC|
ZONE = 1
VAR = 3
```

$!GETVARNUMBYNAME

Syntax: $!GETVARNUMBYNAME <macrovar>
NAME = <string>

Description: Given a variable name, get the number for that variable. This variable number can then be used to assign attributes, such as what variable to use for contouring.

Required Parameter

Parameter	Syntax	Default	Notes
NAME	= <string>		Name of the variable. If a variable has aliases, the name must correspond to one of the aliases.

Example:

Get the variable number for the variable named PRESSURE and make it the contouring variable.

```
$!GETVARNUMBYNAME |PVARNUM|
 NAME = "PRESSURE"
$!GLOBALCONTOUR
 VAR = |PVARNUM|
```

$!GETZONETYPE

Syntax: $!GETZONETYPE |<macrovar>|
ZONE = <integer>
[no optional parameters]

Description: Query for the zone type of the specified zone. The zone type will be assigned to <macrovar>.

The possible return values are:

```
"ORDERED"
"FELINESEG"
"FETRIANGLE"
"FEQUAD"
```

```
"FETETRA"
"FEBRICK"
"FEPOLYGON"
"FEPOLYHEDRON"
```

Required Parameter

Parameter	Syntax	Default	Notes
ZONE	= <integer>		Zone must be greater than or equal to one.

Example:

```
$!GETZONETYPE |ZONETYPE|
  ZONE = 1
$!IF "|ZONETYPE|" == "FETRIANGLE"
  $!PAUSE "The zone is FE-Triangle."
$!ENDIF
```

$!GLOBALCOLORMAP

Syntax: `$!GLOBALCOLORMAP [<groupnumbers>]`
`[optional parameters]`

Description: A SetValue command that changes the settings for the global contour color map and the global light source shading color map in Tecplot 360. Changes here affect all frames using these color maps. See $!GLOBALCONTOUR COLORMAPFILTER for additional settings that can be applied on a frame-by-frame basis.

Optional Parameters

If you would like the settings in these commands to persist, add them to your *tecplot.cfg* file (located in your installation directory).I

Parameter	Syntax	Default	Notes
CONTOURCOLORMAP	= <colormap>	SMRAINBOW	
GRAYSCALE	<<colormapcontrolpoints>>		
GROUPNUMBER	= <integer>	1	Group number must be between 1 and 8.
LGRAINBOW	<<colormapcontrolpoints>>		
MODERN	<<colormapcontrolpoints>>		
SMRAINBOW	<<colormapcontrolpoints>>		
TWOCOLOR	<<colormapcontrolpoints>>		
USERDEFINED	<<colormapcontrolpoints>>		
USERDEFINED NUMCONTROLPOINTS	= <integer>		

Example:

Make the third control point for the small rainbow color map for the 4th Color Map group to be positioned 0.44 of the way across the color map. Set the leading and trailing RGB red value to 90:

```
$!GLOBALCOLORMAP 4
SMRAINBOW
{
 CONTROLPOINT 3
 {
 COLORMAPFRACTION = 0.44
 LEADRGB
```

```
  {R = 90}
  TRAILRGB
  {R = 90}
 }
 }
```

$!GLOBALCONTOUR

Syntax: `$!GLOBALCONTOUR <contourgroup>`
`[optional parameters]`

Description: A SetValue command that changes global attributes associated with contour plots or contour levels. The optional parameter <contourgroup> refers to the defined contour groups, 1-8, allowed in Tecplot 360, and takes an integer value of one through eight. The <contourgroup> parameter is optional, and if omitted, Tecplot 360 will use contour group 1. If you would like the settings in these commands to persist, add them to your *tecplot.cfg file*, located in your installation directory. The `NUMBERFORMAT` setting for `LABELS` also controls the number format in the legend.

Optional Parameters

If you would like the settings in these commands to persist, add them to your *tecplot.cfg* file (located in your installation directory).

Parameter	Syntax	Default	Notes
CONTOURLINESTYLE			This is used to assign a special line pattern scheme for contour line plots.
{			
CONTOURLINEMODE	= <contourlinemode>		
LINESKIP	<op> <integer>		
PATTERNLENGTH	<op> <dexp>		
}			
COLORCUTOFF			
{			
INCLUDEMAX	= <boolean>	YES	
INCLUDEMIN	= <boolean>	YES	
RANGEMAX	<op> <dexp>	= 0.75	
RANGEMIN	<op> <dexp>	= 0.25	
}			
COLORMAPFILTER			The global color map is defined using the $!COLORMAP command. COLORMAPFILTER allows each frame to make adjustments to the global color map that will only apply to the active frame.
{			
COLORMAPCYCLES	<op> <integer>		
COLORMAPDISTRIBUTION	<colormapdistribution>		
COLORMAPOVERRIDE	<integer> <<colormapoverride>>		Use <integer> to choose which override to operate on.
COLORMAPOVERRIDEACTIVE	= <boolean>	NO	
CONTINUOUSCOLOR	<<continuouscolor>>	CMIN=0, CMAX=1	
REVERSECOLORMAP	= <boolean>		
USEFASTAPPROXCONTINUOUSFLOOD	= <boolean>		
ZEBRA	<<zebrashade>>		
}			

Parameter	Syntax	Default	Notes
DEFNUMLEVELS	= <integer>	15	Sets the target number of contour levels for situations where contour levels are automatically reset. Tecplot 360 will attempt to create levels where the start, end and increment values are all clipped floating point values.
LABELS			
{			
ALIGNAUTOLABELS	= <boolean>	YES	If YES, automatic labels are aligned with the contour lines, otherwise they are horizontal.
AUTOLABELSPACING	<op> <dexp>	= 30	
AUTOLEVELSKIP	<op> <integer>	= 1	Value is in Y-frame units.
COLOR	= <color>	BLACK	
FILLCOLOR	= <color>	WHITE	
GENERATEAUTOLABELS	= <boolean>	YES	If YES, automatic labels are repositioned on each redraw.
ISFILLED	= <boolean>	YES	
LABELWITHVALUE	= <boolean>	YES	If YES, automatic labels show the contour value otherwise they show the contour level number.
MARGIN	<op> <dexp>	= 5	
NUMFORMAT	<<numberformat>>	See Notes	FORMATTING= BESTFLOAT, CUSTOMLABEL=1, PRECISION=4, SHOWDECIMALSON WHOLENUMBERS=NO, REMOVELEADINGZEROS=NO, SHOWNEGATIVESIGN= YES, TIMEDATEFORMAT= 'yyyy-mm-dd hh:mm:ss.00'
SHOW	= <boolean>	NO	
TEXTSHAPE	<<textshape>>	FONTFAMILY= "Helevetica", ISBOLD=NO, ISITALIC=NO SIZEUNITS=FRAME, HEIGHT=1.5	Not allowed to change size units parameter.
}			
LEGEND			
{			
ANCHORALIGNMENT	<anchoralignment>	TOPRIGHT	
AUTORESIZE	= <boolean>	NO	
AUTOSIZEMAXLIMIT	= <double>	0.5	
BOX	<<textbox>>	See Notes	BOXTYPE=HOLLOW, MARGIN=10, LINETHICKNESS=0.1, COLOR=BLACK, FILLCOLOR=WHITE
HEADERTEXTSHAPE	<<textshape>>	FONTFAMILY= "Helvetica", ISBOLD=NO, ISITALIC=NO, SIZEUNITS=FRAME, HEIGHT=2.5	
INCLUDECUTOFFLEVELS	= <boolean>	NO	
ISVERTICAL	= <boolean>	YES	
LABELINCREMENT	= <double>	1	
LABELLOCATION	= <contourlabellocation>	CONTOURLEVELS	
NUMBERTEXTSHAPE	<<textshape>>	FONTFAMILY= "Helvetica", ISBOLD=NO, ISITALIC=NO, SIZEUNITS=FRAME, HEIGHT=2.5	
OVERLAYBARGRID	= <boolean>	YES	Thin line around each band in the color bar.
ROWSPACING	<op> <dexp>	= 1.2	

Parameter	Syntax	Default	Notes
SHOW	= <boolean>	NO	
SHOWHEADER	= <boolean>	YES	
TEXTCOLOR	= <color>	BLACK	
XYPOS	<<xy>>	X = 95, Y = 80	
}			
VAR	= <integer>	3	Variable used for contour levels.
COLORCUTOFF			
{			
RANGEMIN	= <double>	-1 x 10^{150}	
RANGEMAX	= <double>	-1 x 10^{150}	
INCLUDEMIN	= <boolean>	NO	
INCLUDEMAX	= <boolean>	NO	
INVERTCUTOFF	= <boolean>	NO	
}			
COLORMAPFILTER			
{			
GROUP	= <integer>	1	
COLORMAPDISTRIBUTION		BANDED	
CONTINUOUSCOLOR			
{			
CMIN	= <integer>	0	
CMAX	= <integer>	1	
}			
REVERSECOLORMAP	= <boolean>	NO	
ZEBRA			
{			
INCLUDE	= <boolean>	NO	
ISTRANSPARENT	= <boolean>	NO	
COLOR	= <color>	BLACK	
}			
COLORMAPCYCLES	= <integer>	1	
USEFASTAPPROXCONTINUOUSFLOOD	= <boolean>	NO	
COLORMAPOVERRIDEACTIVE	= <boolean>	NO	
COLORMAPOVERRIDE	= <boolean>	NO	
}			
CONTOURLINESTYLE			
{			
CONTOURLINEMODE	= <contourlinemode>	USEZONELINETYPE	
LINESKIP	= <integer>	4	
PATTERNLENGTH	= <dexp>	2	
}			

Example:

This example does the following: Turns on the contour legend; Sets the flood cutoff to go from 3 to 5; Reverses the color map; Inserts a color map override of yellow between contour level number 7 and level number 9.

```
$!GLOBALCONTOUR 1
LEGEND
{
 SHOW = YES
}
```

```
COLORCUTOFF
{
 RANGEMIN = 3
 RANGEMAX = 5
 INCLUDEMIN   = YES
 INCLUDEMAX = YES
}
COLORMAPFILTER
{
 REVERSECOLORMAP = YES
 COLORMAPOVERRIDEACTIVE = YES
 COLORMAPOVERRIDE 1
 {
 INCLUDE    = YES
 COLOR      = YELLOW
 STARTLEVEL = 7
 ENDLEVEL   = 9
}
}
```

$!GLOBALEDGE

Syntax: `$!GLOBALEDGE`

Description: A SetValue command that sets attributes which sets the minimum crease angle for edges.

Optional Parameters

If you would like the settings in this command to persist, add them to your *tecplot.cfg* file (located in your installation directory).

Parameter	Syntax	Default	Notes
MINCREASEANGLE	= <double>	135	

$!GLOBALFRAME

Syntax: `$!GLOBALFRAME`
`[optional parameters]`

Description: A SetValue command that sets attributes which apply to all frames. If you would like the settings in this command to persist, add it to your tecplot.cfg file, located in your installation directory.

Optional Parameters

If you would like the settings in this command to persist, add them to your *tecplot.cfg* file (located in your installation directory).

Parameter	Syntax	Default	Notes
FRAMEHEADERFORMAT	= <string>		The <string> contains the text that appears in each of Tecplot 360's frame headers. This string typically contains dynamic text. See also Section 18 - 1.5 "Dynamic Text" in the User's Manual. The default string is: "&(FRAMENAME)|&(DATE)|&(DATASETTITLE)."
FRAMEHEADERHEIGHT	<op> <dexp>	= 0.2	Value is in inches.
SNAPTOGRID	= <boolean>	NO	Even if set to YES, Tecplot 360 may not allow snapping in some situations.

Parameter	Syntax	Default	Notes
SNAPTOPAPER	= <boolean>	NO	Even if set to YES, Tecplot 360 may not allow snapping in some situations.
USETHICKERACTIVE-FRAMEBORDERONSREEN	= <boolean>	YES	When set to YES (which is the default behavior), the active frame displays in the work area with a border one pixel wider than specified, to make the active frame more visible. Set this to NO to keep the active frame the same size as specified (but still black while inactive frames are gray). This will not affect printed or exported material unless the image is exported directly from the workspace.

Example:

Customize the frame header text, and set the frame header height to be 0.25 inches:

```
$!GLOBALFRAME
FRAMEHEADERFORMAT = "My frame, the current date is &(Date), &(Time)"
FRAMEHEADERHEIGHT = 0.25
```

$!GLOBALLINEPLOT

Syntax: `$!GLOBALLINEPLOT [optional parameters]`

Description: A SetValue command that changes global attributes associated with Line-plots. If you would like the settings in these commands to persist, add it to your *tecplot.cfg* file, located in your installation directory.

Optional Parameters

If you would like the settings in these commands to persist, add them to your *tecplot.cfg* file (located in your installation directory).

Parameter	Syntax	Default	Notes
DATALABELS {			These are text values that can be added to a plot to show the indices or values for the data points.
COLOR	= <color>	BLACK	
COLORBYZONEMAP	= <boolean>	NO	
DISTANCESKIP	<op> <dexp>	= 5	
INCLUDEBOX	= <boolean>	YES	
INDEXSKIP	<op> <integer>	= 1	
NODELABELTYPE	= <labeltype>	INDEX	
NUMFORMAT	<<numberformat>>		
SHOWNODELABELS	= <boolean>	NO	
SKIPMODE	= <skipmode>	BYINDEX	
TEXTSHAPE	<<textshape>>	See Notes	Not allowed to change size units parameter. FONTFAMILY="Helvetica", ISBOLD=NO, ISITALIC=NO, SIZEUNITS=FRAME, HEIGHT=3
CELLLABELTYPE	= <labeltype>	INDEX	
}			
LEGEND {			Attributes for an optional legend added to a Line-plot. Entries in the legend are determined dynamically by Tecplot 360 depending on which mappings are turned on.
ANCHORALIGNMENT	= <anchoralignment>	TOPRIGHT	

Parameter	Syntax	Default	Notes
BOX	<<textbox>>	See Notes	BOXTYPE=HOLLOW, MARGIN=10, LINETHICKNESS=0.1, COLOR=BLACK, FILLCOLOR=WHITE
ROWSPACING	<op> <dexp>	= 1.2	
SHOW	= <boolean>	NO	
SHOWTEXT	= <boolean>	YES	
TEXTCOLOR	= <color>	BLACK	
TEXTSHAPE	<<textshape>>	See Notes	Not allowed to change size units. FONTFAMILY="Helvetica", ISBOLD=YES, ISITALIC=NO, SIZEUNITS=FRAME, HEIGHT=3
XYPOS	<<xy>>	X=95, Y=80	
}			

Example:

Turn on the data labels and show the Line-legend. Use boldface Times font in the legend:

```
$!GLOBALLINEPLOT
DATALABELS
{
 SHOWNODELABELS = YES
}
LEGEND
{
 SHOW = YES
 TEXTSHAPE
 {
  FONTFAMILY = "Times"
  ISBOLD = YES
  ISITALIC = NO
 }
}
}
```

$!GLOBALLINKING

Syntax: `$!GLOBALLINKG LINKCOLORMAPS` = <boolean>

Description: Set to YES to tie all colormaps together. If you would like the settings in this command to persist, add it to your tecplot.cfg file, located in your installation directory.

Required Parameters

If you would like the settings in this command to persist, add them to your *tecplot.cfg* file (located in your installation directory).

Parameter	Syntax	Default	Notes
LINKCOLORMAPS	= <boolean>	YES	

$!GLOBALPAPER

Syntax: `$!GLOBALPAPER`
`[optional parameters]`

Description: A SetValue command that sets the paper size characteristics. If you would like the settings in this command to persist, add it to your tecplot.cfg file, located in your installation directory.

Optional Parameters

If you would like the settings in these commands to persist, add them to your *tecplot.cfg* file (located in your installation directory).

Parameter	Syntax	Default	Notes
PAPERSIZEINFO			
{			
LETTER	<<papersize>>		WIDTH=8.5, HEIGHT=11, LEFTHARDCLIPOFFSET=0.125, RIGHTHARDCLIPOFFSET=0.125, TOPHARDCLIPOFFSET=0.125, BOTTOMHARDCLIPOFFSET=0.125
DOUBLE	<<papersize>>		
A3	<<papersize>>		WIDTH=11.693, HEIGHT=16.535, LEFTHARDCLIPOFFSET=0.125, RIGHTHARDCLIPOFFSET=0.125, TOPHARDCLIPOFFSET=0.125, BOTTOMHARDCLIPOFFSET=0.125
A4	<<papersize>>		WIDTH=8.2677, HEIGHT=11.693, LEFTHARDCLIPOFFSET=0.125, RIGHTHARDCLIPOFFSET=0.125, TOPHARDCLIPOFFSET=0.125, BOTTOMHARDCLIPOFFSET=0.125
CUSTOM1	<<papersize>>		
CUSTOM2	<<papersize>>		
}			

See also: Section "$!PAGE" on page 164.

$!GLOBALPOLAR

Syntax: `$!GLOBALPOLAR [optional parameters]`

Description: Allows polar plots to have curved lines that are interpolated along the R-Axis between data points.

Optional Parameters

If you would like the settings in this command to persist, add them to your *tecplot.cfg* file (located in your installation directory).

Parameter	Syntax	Default	Notes
ANGLE	= <double>	5	Determines the angle for which lines will be approximated as curves.
DRAWSTRAIGHTLINES	= <boolean>	YES	Alternates between straight and curved interpolated lines for polar plots.

Example:

This example turns on curved lines and defines the maximum angle to be approximated as a curved line to be 2.0 degrees.

```
$!GLOBALPOLAR
DRAWSTRAIGHTLINES = NO
ANGLE = 2.0
```

Syntax:
```
$!GLOBALRGB
RGBMode = <rgbmode>
    [optional parameters]
```

Description: Allows RGB coloring for plots which have RGB values specified at each vertex. This coloring option is valuable for plots with entities such as Gas, Oil and Water. RGB Coloring can be assigned to field plot objects such as zones, iso-surfaces and slices

Required Parameter

Parameter	Syntax	Default	Notes
RGBMODE	= <specifyrgb>	SPECIFY RGB	Sets whether the user specifies all three color variables for RGB Coloring, or if Tecplot 360 calculates one variable while the user specifies two.

Optional Parameters

If you would like the settings in these commands to persist, add them to your *tecplot.cfg* file (located in your installation directory).

Parameter	Syntax	Default	Notes
REDCHANNELVAR	= <integer>		Sets variable for the red channel.
GREENCHANNELVAR	= <integer>		Sets variable for the green channel.
BLUECHANNELVAR	= <integer>		Sets variable for the blue channel.
RANGEMIN	= <double>	0.0	
RANGEMAX	= <double>	1.0	
LEGEND			
{			
ANCHORALIGNMENT	= <anchoralignment>	TOPCENTER	
BLUECHANNELLABEL	= <string>		
BOX	<<textbox>>	See Notes	BOXTYPE=NONE, MARGIN=10, LINETHICKNESS=0.1, COLOR=BLACK, FILLCOLOR=WHITE
GREENCHANNELLABEL	= <string>		
HEIGHT	= <double>	10	
REDCHANNELLABEL	= <string>		
RGBLEGENDORIENTATION	= <rgblegendorientation>	RGB	
SHOW	= <boolean>	NO	
SHOWLABELS	= <boolean>	YES	
TEXTCOLOR	= <color>	BLACK	
TEXTSHAPE	<<textshape>>	See Notes	FONTFAMILY="Helvetica", ISBOLD=NO, ISITALIC=NO, SIZEUNITS=FRAME, HEIGHT=2.5
USEBLUEVARNAME	= <boolean>	YES	
USEGREENVARNAME	= <boolean>	YES	
USEREDVARNAME	= <boolean>	YES	
XYPOS	<<xy>>	X = 80, Y = 80	
}			

Example:

This example turns on RGB Coloring and defines variables for the Red and Green Channel, leaving Tecplot 360 to calculate the Blue Channel values.

```
$!GLOBALRGB
RGBMODE = SPECIFYRG
REDCHANNELVAR = 1
GREENCHANNELVAR = 4
```

$!GLOBALSCATTER

Syntax: `$!GLOBALSCATTER`
`[optional parameters]`

Description: A SetValue command that changes global attributes associated with scatter plots.

Optional Parameters

If you would like the settings in these commands to persist, add them to your *tecplot.cfg* file (located in your installation directory).

Parameter	Syntax	Default	Notes
BASEFONTFAMILY	= <string>	"Helvetica"	
DATALABELS			These are text labels that can be added to a plot to show node or cell values.
{			
CELLLABELTYPE	= <labeltype>	INDEX	
CELLLABELVAR	= <integer>		
COLOR	= <color>	BLACK	
COLORBYZONEMAP	= <boolean>	NO	
DISTANCESKIP	<op> <dexp>		
INCLUDEBOX	= <boolean>	YES	
INDEXSKIP	<op> <integer>	1	
NODELABELTYPE	= <labeltype>	INDEX	
NODELABELVAR	<op> <integer>		
NUMFORMAT	<<numberformat>>	See Notes	FORMATTING=BESTFLOAT, CUSTOMLABEL=1, PRECISION=4, SHOWDECIMALSONWHOLENUMBERS=NO, REMOVELEADINGZEROS=NO, SHOWNEGATIVESIGN=YES, TIMEDATEFORMAT='yyyy-mm-dd hh:mm:ss.00'
SHOWCELLLABELS	= <boolean>	NO	
SHOWNODELABELS	= <boolean>	NO	
SKIPMODE	= <skipmode>		
TEXTSHAPE	<<textshape>>	FONTFAMILY= "Helvetica", ISBOLD=NO, ISITALIC=NO, SIZEUNITS=FRAME, HEIGHT=3	Not allowed to change size units parameter
}			
ISBOLD	= <boolean>	YES	
ISITALIC	= <boolean>	NO	
LEGEND			
{			
ANCHORALIGNMENT	<<anchorpos>>	TOPRIGHT	

Parameter	Syntax	Default	Notes
BOX	<<textbox>>	See Notes	BOXTYPE=HOLLOW,MARGIN=10, LINETHICKNESS=0.1, COLOR=BLACK, FILLCOLOR=WHITE
ROWSPACING	<op> <dexp>	= 1.2	
SHOW	= <boolean>	NO	
SHOWTEXT	= <boolean>	YES	
TEXTCOLOR	= <color>	BLACK	
TEXTSHAPE	<<textshape>>	FONTFAMILY= "Helvetica", ISBOLD=YES, ISITALIC=NO, SIZEUNITS=FRAME, HEIGHT=3	Not allowed to change size units parameter.
XYPOS	<<xy>>	X=95, Y=80	
}			
REFSCATSYMBOL			
{			
COLOR	= <color>	RED	
FILLCOLOR	= <color>	RED	
ISFILLED	= <boolean>	NO	
LINETHICKNESS	<op> <dexp>	= 0.1	
MAGNITUDE	<op> <dexp>	= 1	
SHOW	= <boolean>	NO	
SYMBOLSHAPE	<<symbolshape>>	See Notes	ISASCII=NO, GEOMSHAPE=SQUARE
XYPOS	<<xy>>	X=80, Y=80	
}			
RELATIVESIZE	<op> <dexp>	= 0	Scaling factor for scatter symbols sized "By Variable."
RELATIVESIZEINGRIDUNITS	= <boolean>	YES	If YES, scatter sizing "By Variable" is in grid units /magnitude otherwise centimeters/magnitude.
SPHERESCATTERRENDERQUALITY	= <spherescatterrenderquality>	HIGH	Config file and stylesheet only option.
VAR	= <integer>		Scatter sizing variable.

Example:

This example does the following:

- Increases the relative size of scatter symbols that are sized by variable by ten percent.
- Turns on the scatter sizing legend.
- Turns on the reference scatter symbol and makes it red.
- Turns on data labels for nodes.

```
$!GLOBALSCATTER
RELATIVESIZE * = 1.1
LEGEND
{
 SHOW = YES
}
REFSCATSYMBOL
{
 SHOW = YES
 COLOR = RED
}
DATALABELS
{
```

```
  SHOWNODELABELS = YES
 }
```

$!GLOBALTHREED

Syntax: `$!GLOBALTHREED`
`[optional parameters]`

Description: A SetValue command that changes global attributes associated with 3D plots.

Optional Parameters

If you would like the settings in these commands to persist, add them to your *tecplot.cfg* file (located in your installation directory).

Parameter	Syntax	Default	Notes
AXISBOXPADDING	<op> <dexp>	= 5	
AXISSCALEFACT	<<xyz>>	X=1, Y=1, Z=1	The 3D axis must be INDEPENDENT for this option to work properly. See $!THREEDAXIS.
LIGHTSOURCE			
{			
BACKGROUNDLIGHT	= <double>	25	
INCLUDESPECULAR	= <boolean>	YES	
INTENSITY	= <double>	75	
SPECULARINTENSITY	= <integer>	40	Range = 1-100
SPECULARSHININESS	= <integer>	60	Range = 1-100
SURFACECOLORCONTRAST	= <double>	100	
XYZDIRECTION	<<xyz>>	X = -0.2, Y = -0.2, Z = 0.959...	Always specify all three components here. Tecplot 360 normalizes X, Y and Z after processing the Z-component. X, Y and Z represent a vector in the eye coordinate system.
FORCEGOURADFOR3DCONTFLOOD	= <boolean>	YES	
FORCEPANELED**FOR3DCELLFLOOD**	= <boolean>	YES	
}			
LINELIFTFRACTION	<op> <dexp>	= 0.2	
NEARPLANEFRACTION	<dexp>	0.1	Specify the position of the "near plane". In a 3D plot, the "near plane" acts as a windshield: anything in front of this plane does not display.
PERFORMEXTRA3D SORTING	<boolean>	NO	
PLACEMENTPLANE POSITION			Specify the coordinate of the placement plane.
{			
X	= <double>		
Y	= <double>		
Z	= <double>		
}			
ROTATEORIGIN	<<xyz>>	X=0.5, Y=0.5, Z=0.5	
SLICE			
{			
ORIGIN	<<xyz>>	X=0, Y=0, Z=0	

Parameter	Syntax	Default	Notes
NORMAL	<<xyz>>	X=0, Y=0, Z=1	
}			
SYMBOLLIFT FRACTION	<op> <dexp>	= 0.6	
VECTORLIFT FRACTION	<op> <dexp>	= 0.7	

Example:

```
$!GLOBALTHREED ROTATEORIGIN{X = 4.36052333891}
$!GLOBALTHREED
LIGHTSOURCE
 {
   XYZDIRECTION
    {
      X = 0.398226616447
      Y = 0.435028248588
      Z = 0.807567944438
    }
}
$!GLOBALTHREED LIGHTSOURCE{INTENSITY = 80}
$!GLOBALTHREED LIGHTSOURCE{BACKGROUNDLIGHT = 25}
$!GLOBALTHREED LIGHTSOURCE{SURFACECOLORCONTRAST = 85}
$!GLOBALTHREED LINELIFTFRACTION = 7
$!GLOBALTHREED SYMBOLLIFTFRACTION = 0.5
$!GLOBALTHREED VECTORLIFTFRACTION = 6
$!GLOBALTHREED PERFORMEXTRA3DSORTING = YES
```

$!GLOBALTHREEDVECTOR

Syntax: `$!GLOBALTHREEDVECTOR [optional parameters]`

Description: A SetValue command that changes global attributes associated with 3D vector plots.

Optional Parameters

If you would like the settings in these commands to persist, add them to your *tecplot.cfg* file (located in your in installation directory).

Parameter	Syntax	Default	Notes
ARROWHEADANGLE	<op> <dexp>	= 18	Angle is in degrees.
HEADSIZEASFRACTION	<op> <dexp>	= 0.2	Head is sized as a fraction of the stem length.
HEADSIZEINFRAMEUNITS	<op> <dexp>	= 2	Value is in Y-frame units.
REFVECTOR			
{			
SHOW	= <boolean>	NO	
COLOR	= <color>	BLACK	
MAGNITUDE	<op> <dexp>	= 1	
LINETHICKNESS	<op> <dexp>	= 0.1	
ANGLE	<op> <dexp>	= 0	
XYPOS	<<xy>>	X=80, Y=80	
MAGNITUDELABEL			

Parameter	Syntax	Default	Notes
{			
SHOW	= <boolean>	NO	
TEXTCOLOR	= <color>	BLACK	
TEXTSHAPE	<<textshape>>	FONTFAMILY= "Helvetica", ISBOLD=YES, ISITALIC=NO, SIZEUNITS=FRAME, HEIGHT=3	
NUMFORMAT	<<numberformat>>		
OFFSET	= <double>	2	
}			
}			
RELATIVELENGTH	<op> <dexp>	= 0	
RELATIVELENGTHINGRIDUNITS	= <boolean>	YES	If YES and USERELATIVE is YES then vectors are sized in Grid Units/Magnitude. If NO and USERELATIVE is YES then vectors are sized in cm/magnitude.
SIZEHEADBYFRACTION	= <boolean>	YES	If YES, HEADSIZEASFRACTION is used to size arrowheads otherwise HEADSIZEINFRAMEUNITS is used.
UNIFORMLENGTH	<op> <dexp>	= 2	Value is in Y-frame units.
USERELATIVE	= <boolean>	YES	If NO, vectors are all the same size (UNIFORMLENGTH).
UVAR	= <integer>		Variable number for the X-vector component.
VVAR	= <integer>		Variable number for the Y-vector component.
WVAR	= <integer>		Variable number for the Z-vector component.

Example:

This example does the following:

- Makes all vectors be uniform in size; 5 percent in Y-frame units.
- Makes the arrowheads 0.2 times the size of the stems.
- Turns off the reference vector.

```
$!GLOBALTHREEDVECTOR
USERELATIVE = NO
UNIFORMLENGTH = 5
HEADSIZEASFRACTION = .2
REFVECTOR
{
 SHOW = NO
}
```

$!GLOBALTIME

Syntax: `$!GLOBALTIME SolutionTime`

Description: A SetValue command for frames (2D and 3D ONLY). Different frames can have different values of `$!GLOBALTIME`. If you would like the settings in this command to persist, add them to your *tecplot.cfg* file (located in your installation directory).

Parameter	Syntax	Default	Notes
SOLUTIONTIME	= <double>	0	If SolutionTime is not set to a solution time in set of solution times from all zones of the active strand field-maps, SolutionTime is adjusted to the closest value in that set.

Syntax: `$!GLOBALTWODVECTOR [optional parameters]`

Description: A SetValue command that changes global attributes associated with 2D vector plots.

Optional Parameters

If you would like the settings in these commands to persist, add them to your *tecplot.cfg* file (located in your installation directory).

Parameter	Syntax	Default	Notes
ARROWHEADANGLE	<op> <dexp>	= 18	Angle is in degrees.
HEADSIZEAS FRACTION	<op> <dexp>	= 0.2	Head is sized as a fraction of the stem length.
HEADSIZEINFRAME UNITS	<op> <dexp>	= 2	Value is in Y-frame units.
REFVECTOR			
{			
SHOW	= <boolean>	NO	
COLOR	= <color>	BLACK	
MAGNITUDE	<op> <dexp>	= 1	
LINETHICKNESS	<op> <dexp>	= 0.1	
ANGLE	<op> <dexp>	= 0	
XYPOS	<<xy>>	X=80, Y=80	
MAGNITUDELABEL			
{			
SHOW	= <boolean>	NO	
TEXTCOLOR	= <color>	BLACK	
TEXTSHAPE	<<textshape>>	See Notes	FONTFAMILY="Helvetica", ISBOLD=YES, ISITALIC=NO, SIZEUNITS=FRAME, HEIGHT=3
NUMFORMAT	<<numberformat>>		
OFFSET	= <double>	2	
}			
}			
RELATIVELENGTH	<op> <dexp>	= 0	
RELATIVELENGTH INGRIDUNITS	= <boolean>	YES	If YES and USERELATIVE is YES then vectors are sized in Grid Units/Magnitude. If NO and USERELATIVE is YES then vectors are sized in cm/magnitude.
SIZEHEADBY FRACTION	= <boolean>	YES	If YES, HEADSIZEASFRACTION is used to size arrowheads otherwise HEADSIZEINFRAMEUNITS is used.
UNIFORMLENGTH	<op> <dexp>	= 2	Value is in Y-frame units.
USERELATIVE	= <boolean>	YES	If NO, vectors are all the same size (UNIFORMLENGTH).
UVAR	= <integer>		Variable number for the X-vector component.
VVAR	= <integer>		Variable number for the Y-vector component.

Example:

This example does the following:

- Doubles the vector length (assume vectors currently drawn using relative length).
- Make the vector heads uniform in size; 2 percent in frame units.

- Make the head angle 15 degrees.

```
$!GLOBALTWODVECTOR
RELATIVELENGTH *= 2
SIZEHEADBYFRACTION = NO
HEADSIZEINFRAMEUNITS = 2
HEADANGLE = 15
```

I

$!IF...$!ENDIF

Syntax: `$!IF <conditionalexp>`
`$!ENDIF`

Description: Conditionally process macro commands.

Examples:

Example 1:

Process macro commands if the macro variable `|myvar|` is less than 73.2:

```
$!IF |myvar| < 73.2
$!ENDIF
```

Example 2:

Process macro commands if the macro variable `|response|` is `YES`:

```
$!IF "|response|" == "YES"
   .
   .
   .
$!ENDIF
```

$!INCLUDEMACRO

Syntax: `$!INCLUDEMACRO <string>`

Description: Insert the commands from another macro file. Because the `$!INCLUDEMACRO` command is processed when the macro is loaded and not when the macro is executed, you are not allowed to reference macro variables within the <string> parameter.

Example: Include the macro file `m2.mcr`:

```
$!INCLUDEMACRO "m2.mcr"
```

$!INTERFACE

Syntax: `$!INTERFACE`
`[optional parameters]`

Description: A SetValue command that sets attributes related to the Tecplot 360 interface.

Optional Parameters

If you would like the settings in these commands to persist, add them to your *tecplot.cfg* file (located in your installation directory).

Parameter	Syntax	Default	Notes
ALLOWDATAPOINTSELECT	= <boolean>	YES	If YES, Tecplot 360 allows you to use the Adjustor tool to select and move data points.
ALLOWDATAPOINTADJUST	= <boolean>	YES	
ALWAYSPOPACTIVEFRAME	= <boolean>	NO	If YES, whenever the active frame changes in the interface, Tecplot 360 moves the active frame to the top of the draw order. This makes Tecplot 360 run like v.11.3 and earlier versions, and may help older add-on and macros to run correctly. Default is NO.
AUTOREDRAWISACTIVE	= <boolean>	YES	Set to NO to turn Auto Redraw off.
BACKINGSTOREMODE	= <backingstoremode>	REALTIMEUPDATE	
BEEPONFRAMEINTERRUPT	= <boolean>	NO	
CACHELIGHTDISPLAY LISTSONLY	= <boolean>	NO	When caching graphics in display lists, only cache those objects which use little memory. When this is on, only approximated plots are saved. Full plots are not saved. This only has an effect if USEDISPLAYLISTS is set to YES, and if USEAPPROXIMATEPLOTS is YES.
CONSERVEDERIVED VARIABLESPACE	= <boolean>		
COLLECTTIME STATISTICS	= <boolean>	NO	
DATA			
{			
SMOOTHBNDRYCOND	= <boundarycondition>	FIXED	
NUMSMOOTHPASSES	<op> <integer>	= 1	
SMOOTHWEIGHT	<op> <dexp>	= 0.5	
INVDISTEXPONENT	<op> <dexp>	= 3.5	
INVDISTMINRADIUS	<op> <dexp>	= 0	
LINEARINTERPCONST	<op> <dexp>	= 0	
LINEARINTERPMODE	= <linearinterpmode>	SETTOCONST	
INTERPPTSELECTION	= <pointselection>	OCTANTNPOINTS	
INTERPNPOINTS	<op> <integer>	= 8	
KRIGRANGE	<op> <dexp>	= 0.3	
KRIGZEROVALUE	<op> <dexp>	= 0	
KRIGDRIFT	= <krigdrift>	LINEAR	
DERIVATIVEBOUNDARY	= <derivpos>	SIMPLE	
TRIANGLEKEEPFACTOR	<op> <dexp>	= 0.25	
VARIABLEDERIVATIONMETHOD	= *[ACCURATE or FAST]*	FAST	
VOLUMECELLINTERPOLATIONMODE	= *[TRILINEAR or PIECEWISELINEAR]*	PIECEWISELINEAR	By default, volume interpolation is piece-wise linear and calculates for first-order accuracy. This tri-linear interpolation option calculates for second-order accuracy.
EXTRACTSLICEFROMPLANECOPYCELLCENTERS	= <boolean>	NO	

Parameter	Syntax	Default	Notes
CONTLINECREATEMODE	= *[ONEZONEPERCONTOURLEVEL, ONEZONEPERINDEPENDENTPOLYLINE]*	ONEZONEPERCONTOURLEVEL	
POLYCELLINTERPOLATIONMODE	= *[USECCVALUE, AVERAGENODES]*	AVERAGENODES	This parameter only appears in the tecplot config file. When using contour flooding, contour lines, or precise value blanking for polyhedral and polygonal data, it chooses between using the cell-centered value or using the average of the nodes. This parameter also applies to the creation of iso-surfaces for cell-centered values in a polyhedral zone. It does not apply to Primary Value contour flooding.
}			
DIALOGPLACEMENT			The DIALOGPLACMENT parameter may only appear in the tecplot config file. You may specify the placement of the indicated dialogs. Dialog placement is relative to the main Tecplot 360 window.
{			
ADVANCED3DCONTROLDIALOG	<<dialogplacement>>		
AXISEDITDIALOG	<<dialogplacement>>		
COLORMAPDIALOG	<<dialogplacement>>		
CONTOURDIALOG	<<dialogplacement>>		
CREATE1DLINEDIALOG	<<dialogplacement>>		
CREATECIRCULARZONEDIALOG	<<dialogplacement>>		
CREATERECTANGULARZONEDIALOG	<<dialogplacement>>		
CREATEZONEFROMPOLYLINESDIALOG	<<dialogplacement>>		
CREATEZONEFROMVALUESDIALOG	<<dialogplacement>>		
CURVEINFODIALOG	<<dialogplacement>>		
DATAINFODIALOG	<<dialogplacement>>		
DATALABELSDIALOG	<<dialogplacement>>		
DATASPREADSHEETDIALOG	<<dialogplacement>>		
DELETEVARIABLESDIALOG	<<dialogplacement>>		
DELETEZONESDIALOG	<<dialogplacement>>		
DEPTHBLANKINGDIALOG	<<dialogplacement>>		
DUPLICATEZONEDIALOG	<<dialogplacement>>		
EQUATIONDIALOG	<<dialogplacement>>		
EXPORTDIALOG	<<dialogplacement>>		
EXTRACTCONTOURLINESDIALOG	<<dialogplacement>>		
EXTRACTDISCRETEPOINTSDIALOG	<<dialogplacement>>		
EXTRACTFEBOUNDARYDIALOG	<<dialogplacement>>		
EXTRACTISOSURFACESDIALOG	<<dialogplacement>>		
EXTRACTPOINTSFROMGEOMETRYDIALOG	<<dialogplacement>>		

Parameter	Syntax	Default	Notes
EXTRACTPOINTSFROMPOLYLINEDIALOG	<<dialogplacement>>		
EXTRACTSLICEFROMPLANEDIALOG	<<dialogplacement>>		
EXTRACTSLICESDIALOG	<<dialogplacement>>		
EXTRACTSTREAMTRACESDIALOG	<<dialogplacement>>		
EXTRACTSUBZONEDIALOG	<<dialogplacement>>		
IJKBLANKINGDIALOG	<<dialogplacement>>		
IMPORTDIALOG	<<dialogplacement>>		
INVERSEDISTANCEINTERPOLATIONDIALOG	<<dialogplacement>>		
IOFFSET	<<dialogplacement>>		
JOFFSET	<<dialogplacement>>		
ISOSURFACESDIALOG	<<dialogplacement>>		
KRIGINGINTERPOLATIONDIALOG	<<dialogplacement>>		
LIGHTSOURCEDIALOG	<<dialogplacement>>		
LINEARINTERPOLATIONDIALOG	<<dialogplacement>>		
LINEMAPLEGENDDIALOG	<<dialogplacement>>		
LOADDATADIALOG	<<dialogplacement>>		
MACROPLAYDIALOG	<<dialogplacement>>		
MACRORECORDDIALOG	<<dialogplacement>>		
MACROVIEWERDIALOG	<<dialogplacement>>		
MIRRORZONEDIALOG	<<dialogplacement>>		
NEWLAYOUTDIALOG	<<dialogplacement>>		
OPENLAYOUTDIALOG	<<dialogplacement>>		
ORDERFRAMESDIALOG	<<dialogplacement>>		
PAPERSETUPDIALOG	<<dialogplacement>>		
POLARDRAWINGOPTIONSDIALOG	<<dialogplacement>>		
PRINTDIALOG	<<dialogplacement>>		
RULERGRIDDIALOG	<<dialogplacement>>		
SAVEASDIALOG	<<dialogplacement>>		
SAVEDIALOG	<<dialogplacement>>		
SCATTERLEGENDDIALOG	<<dialogplacement>>		
SCATTERREFERENCESYMBOLDIALOG	<<dialogplacement>>		
SCATTERSIZEANDFONTDIALOG	<<dialogplacement>>		
SLICESDIALOG	<<dialogplacement>>		
SMOOTHDIALOG	<<dialogplacement>>		
SPATIALVARSDIALOG	<<dialogplacement>>		
STREAMTRACESDIALOG	<<dialogplacement>>		
STYLELINKINGDIALOG	<<dialogplacement>>		
THREEDAXISLIMITSDIALOG	<<dialogplacement>>		
THREEDORIENTATIONAXISDIALOG	<<dialogplacement>>		
THREEDVIEWDETAILSDIALOG	<<dialogplacement>>		
THREEDVIEWROTATEDIALOG	<<dialogplacement>>		

Parameter	Syntax	Default	Notes
TRANSFORMCOORDINATESDIALOG	<<dialogplacement>>		
TRANSLATEMAGNIFYDIALOG	<<dialogplacement>>		
TRIANGULATEDIALOG	<<dialogplacement>>		
TWODDRAWORDERDIALOG	<<dialogplacement>>		
VALUEBLANKINGDIALOG	<<dialogplacement>>		
VECTORARROWHEADSDIALOG	<<dialogplacement>>		
VECTORLENGTHDIALOG	<<dialogplacement>>		
VECTORREFERENCEVECTORDIALOG	<<dialogplacement>>		
VECTORVARSDIALOG	<<dialogplacement>>		
WRITEDATADIALOG	<<dialogplacement>>		
ZONEMAPSTYLEDIALOG	<<dialogplacement>>		
}			
ENABLEDELAYS	= <boolean>	YES	Enable or disable delays in macro commands.
ENABLEINTERRUPTS	= <boolean>	YES	Enable or disable user interrupts.
ENABLEPAUSES	= <boolean>	YES	Enable or disable pause.
ENABLEWARNINGS	= <boolean>	YES	Enable or disable warning dialogs.
GLOBALPLACEMENTPLANE			Use a placement plane.
{			
SHOW			Turn the placement plane on/off.
PLACEMENTPLANEORIENTATION			Specify the axis orientation of the placement plane.
FONTPATH	<string>	The operating system's font folder(s)	One or more directories where TrueType fonts can be found, e.g. '"PATH1" "PATH2" "PATH3"'. Note use of double quotes around each path and single quotes around the eniter string.
IDOTSPERSQUAREINCH	= <double>		This along with JDOTSPERSQUAREINCH set the size and aspect of the screen. If left unspecified, Tecplot 360 will determine the value for you.
INTIALFIELDPROBEDIALOGPAGE	= *[NODALVALUES, ZONECELLINFO, CELLCENTEREDVALUES, or FACENEIGHBORS]*	NODALVALUES	
INITIALPLOTFIRSTZONEONLY	= <boolean>	NO	If YES, only the first enabled zone is activated. Default shows all zones (except from within a layout).
INITIALPLOTTYPE	= <plottype>	AUTOMATIC	
INTERRUPTCHECKINGFREQUENCY	= <integer>		Set the number of milliseconds between checks for a key- or button-press by the user to interrupt processing in Tecplot 360.
JDOTSPERSQUAREINCH	= <double>		This along with IDOTSPERSQUAREINCH set the size and aspect of the screen. If left unspecified, Tecplot 360 will determine the value for you.
LISTCOMMANDSINMACROVIEWER	= <boolean>		If NO, macro commands are displayed in full one at a time.
LOADADDONSUSINGLAZYRELOCATE	= <boolean>	YES	If set to NO, all add-on symbols are loaded immediately.

Parameter	Syntax	Default	Notes
MAXCUSTOMCOLORSIN INTERFACE	= <integer>	56	UNIX only. Valid values are 1 to 56. Some UNIX displays cannot allocate enough colors for the Tecplot 360 interface. Use this option to limit the number of custom colors displayed in the Tecplot 360 interface.
MAXNUMUNDOLEVELS	= <integer>	50	
MINPIXELSFORDRAG	= <integer>	1	Number of pixels to move the pointer before it is considered a drag.

MOUSEACTIONS
{
MIDDLEBUTTON
{
BUTTONCLICK
SIMPLEDRAG
CONTROLLEDDRAG
ALTEDDRAG
SHIFTEDDRAG
CONTROLALTEDDRAG
CONTROLSHIFTEDDRAG
ALTSHIFTEDDRAG
CONTROLALTSHIFTEDDRAG
}
RIGHTBUTTON
{
BUTTONCLICK
SIMPLEDRAG
CONTROLLEDDRAG
ALTEDDRAG
SHIFTEDDRAG
CONTROLALTEDDRAG
CONTROLSHIFTEDDRAG
ALTSHIFTEDDRAG
CONTROLALTSHIFTEDDRAG
}
}
	
	= <mousebuttonclick>
	= <mousebuttondrag>
	= <mousebuttondrag>
	= <mousebuttondrag>
	= <mousebuttondrag>
	= <mousebuttondrag>
	= <mousebuttondrag>
	= <mousebuttondrag>
	= <mousebuttondrag>
	
	= <mousebuttonclick>
	= <mousebuttondrag>
	= <mousebuttondrag>
	= <mousebuttondrag>
	= <mousebuttondrag>
	= <mousebuttondrag>
	= <mousebuttondrag>
	= <mousebuttondrag>
	
		REDRAW
		ZOOMDATA
		ZOOMDATA
		ZOOMVIEWER
		ZOOMPAPER
		ZOOMVIEWER
		ZOOMPAPER
		ZOOMVIEWER
		ZOOMPAPER
		
		REVERTTOSELECT
		TRANSLATEDATA
		ROLLERBALL ROTATEDATA
		TRANSLATE VIEWER
		TRANSLATEPAPER
		ZOOMVIEWER
		ROLLERBALL ROTATEDATA
		TRANSLATEPAPER
		ZOOMVIEWER	

NUMCOLORCELL STORETURN	= <integer>	10	
NUMMOUSEBUTTONS	= <integer>		This option is only for UNIX users who are using MIDDLEMOUSEBUTTONMODE or RIGHTMOUSEBUTTONMODE.
NUMPTSALLOWEDBEFORE APPROX	= <integer>	500,000	When a frame's active zones contain this many points or less, the frame is not approximated, but always drawn in full. This applies to all frames when PLOTAPPROXIMATIONMODE is AUTOMATIC, and to the active frame only when PLOTAPPROXIMATIONMODE is NONCURRENTALWAYSAPPROX. This setting has no effect when PLOTAPPROXIMATIONMODE is set to ALLFRAMESALWAYSAPPROX.

Parameter	Syntax	Default	Notes
OKTOEXECUTESYSTEMCOMMAND	= <boolean>	YES	Allow use of $!SYSTEM commands in macros. This is a security issue. If set to NO and the macro is run intermittently you will be asked for permission to execute the $!SYSTEM command. If Tecplot 360 is run in batch mode and this is NO an error will be generated and the macro will terminate.
OPENGLCONFIG {			
RUNDISPLAYLISTSAFTERBUILDING	= <boolean>	YES	Tecplot 360 defaults to building and running display lists simultaneously. Turn RunDisplayListsAfterBuilding on if you want to run the display lists after they are built. This may increase display list performance on some machines. The difference is often times negligible.
ALLOWHWACCELERATION	= <boolean>	YES	Windows only. This will disable hardware acceleration for Tecplot 360 without having to change the Windows Display Properties. Setting ALLOWHWACCELERATION to NO may fix errors caused by hardware acceleration on buggy graphics card drivers.
SCREENRENDERING	<<renderconfig>>		Sets options for screen rendering.
IMAGERENDERING	<<renderconfig>>		Sets options for offscreen rendering (for image exports or raster printing).
MAXFILTERMAGNIFICATION	= <integer>	2	Sets the maximum magnification by non-texture resize filter before textures are used. This keeps Tecplot 360 from creating textures which are too large. Setting this above three is not recommended. Setting below 1.0 will result in the use of a faster texture algorithm.
INCLUDEBACKBUFFERDURINGFRONTBUFFERDRAWS	= <boolean>	NO	
}			
PERCENTAGEOFPOINTSTOKEEP	= <integer>	10	Sets the percentage of points to keep in a frame when a frame is approximated. See also Section "Best Practices For Rendering Performance" in the User's Manual.
PICKHANDLEWIDTH	<op> <dexp>	= 0.1	Value is in inches on the screen.
PLOTAPPROXIMATIONMODE	= <plotapproximationmode>	AUTOMATIC	Specifies the mode in which you want the plots to be approximated. See Section "Plot Approximation" in the User's Manual for a complete description of each mode.
PRINTDEBUG	= <boolean>	NO	If YES, debugging information is sent to the standard output.
QUICKCOLORMODE	= <quickcolormode>	LINECOLOR	Choose objects for color changes made using the Quick Edit dialog
ROTATION {			Settings for interactive rotations in 3D.
ROTATIONMODE	= <rotationmode>	XYAXIS	
CURRENTANGLE	<op> <dexp>	= 5	
SMALLANGLE	<op> <dexp>	= 1	
MEDIUMANGLE	<op> <dexp>	= 5	
LARGEANGLE	<op> <dexp>	= 15	

Parameter	Syntax	Default	Notes
ROTATEDEGPERFRAMEUNIT	= <integer>		
SHOWGEOMS	= <boolean>	YES	
}			
ROTATEDEGPERFRAMEUNIT	= <integer>		
RULERPADDING	<op> <dexp>	= 0.05	Distance between workarea ruler and clipping edge for the paper and frames. Units are inches.
RULERTHICKNESS	<op> <dexp>	= 0.15	Value is in inches on the screen.
SCALE			Settings for interactive scaling.
{			
STEPSIZE	<op> <dexp>	= 10	
SMALLSTEP	<op> <dexp>	= 1	
MEDIUMSTEP	<op> <dexp>	= 10	
LARGESTEP	<op> <dexp>	= 20	
ZOOMSCALEPERFRAMEUNIT	<op> <double>	= 4	
}			
SCRBACKGROUNDCOLOR	= <color>		Set the workspace background color.
SECURESPOOLCOMMANDS	= <boolean>	YES	Set to NO to allow $!SPOOLER commands outside the configuration file.
SHOWCONTINUOUSSTATUS	= <boolean>	YES	
SHOWCOORDINATES	= <boolean>	YES	
SHOWCOORDINATESWITHSELECTORADJUSTOR	= <boolean>	NO	When YES, running coordinates for both X&Y are displayed in grid coordinates in the status line for all plot types except 3D. If $!INTERFACE SHOWCOORDINATES is off, the value of SHOWCOORDINATESWITHSELECTORADJUSTOR is ignored. This command is available via the config file (tecplot.cfg) only.
SHOWFRAMEBORDERSWHENOFF	= <boolean>	NO	If YES, frame borders are drawn using a dashed line when they are turned off. This applies only to the screen and does not effect the hardcopy.
SHOWSTATUSLINE	= <boolean>	YES	
SHOWTEXTGEOMSINAPPROXVIEWS	= <boolean>	YES	Set to YES if you want text and geometries to show up in frames using approximated plots
SHOWTOOLTIPS	= <boolean>	YES	
SHOWWAITDIALOGS	= <boolean>	YES	If NO, all "Please Wait" and "Percent Done" dialogs will be disabled.
SIDEBARSIZINGTRANSLATION	= <sidebarsizing>	MAXOFALL	Settings for interactive translation.
{			
STEPSIZE	<op> <dexp>	= 10	
SMALLSTEP	<op> <dexp>	= 5	
MEDIUMSTEP	<op> <dexp>	= 10	
LARGESTEP	<op> <dexp>	= 20	
ZOOMSCALEPERFRAMEUNIT	= <double>		
}			

Parameter	Syntax	Default	Notes
TRUETYPEMINOUTLINE POINTSIZE	= <integer>	19 on Windows 16 on other platforms	Tecplot 360 will use a bitmap font for text smaller than this size.
USEMOD2MASKFORALT DETECTION	= <boolean>	NO	Certain platforms have a problem with the ALT key. Set to YES to bypass the problem.
USECLASSICADJUSTORTOOL	= <boolean>	NO	If set to YES, uses the old-style adjustor tool that selects the closest control point, rather than the whole object, when clicking.
UNIXHELPBROWSERCMD	= <string>	$TECHOME/bin/LaunchBrowser/	Sets the command used to launch a browser for add-ons that use HTML for their help file (UNIX only; the Windows operating system automatically connects to primary browser). For security reasons this command can only be used in the Tecplot 360 configuration file.
TRYTOUSEDOUBLEBUFFER	= <boolean>	YES	
USEINITIALPLOTDIALOG	= <boolean>	YES	
UNIXTRUETYPEFONTPATH	= <string>		Path to where TrueType fonts are stored.
USEAPPROXIMATEPLOTS	= <boolean>	NO	Set to YES to use approximate plots. See Section "Plot Approximation" in the User's Manual for further details.
USEDISPLAYLISTS	= <boolean>	YES	
USEDOUBLEBUFFERING	= <boolean>		
USEDOUBLEFORDISPLAYLISTS	= <boolean>	YES	
USEFASTAPPROXCONTINUOUSFLOOD	= <boolean>		
USEDISPLAYLISTS	= <boolean>		Use stroke fonts for data labels and ASCII scatter symbols in 3D plots.
USEOFFSCREENBITMAP	= <boolean>	YES	Set to YES to render images off-screen.
USEOPENGL	= <boolean>	YES	
USESTROKEFONTSFOR3DTEXT	= <boolean>	YES	Set to YES to use Tecplot 360's internal stroke fonts, set to NO to use True Type fonts. This option is only available on Windows platforms.
USESTROKEFONTSFORSMALLSCREENTEXT	= <boolean>		When using True Type fonts, switch to stroke fonts for small characters.
USESTROKEFONTSONSCREEN	= <boolean>	NO	Set to YES to use Tecplot 360's printer drivers. Set to NO to use your default printer driver.
USETECPLOTPRINTDRIVERS	= <boolean>	NO	
XORCOLOR	<op> <integer>	= 0	Color index to use for XORed lines. Set to 0 to make Tecplot 360 calculate.
XPGONFILLOFFSET	= <integer>	0	
YPGONFILLOFFSET	= <integer>	0	
ZONEMAPNAMECOLUMNWIDTH	= <double>		Range is 10-1000. Sets the width of the Zone/Map Name column under Plot Attributes.

Example:

This example does the following:

- Makes the frame borders show on the screen when they are turned off.
- Makes the middle mouse button be Redraw.
- Makes the right mouse button revert to Selector.

- Makes the default number of passes for smoothing 20.
- Turns off the status line.

```
$!INTERFACE
SHOWFRAMEBORDERSWHENOFF = YES
MOUSEACTIONS
{
 MIDDLEBUTTON
 {
    BUTTONCLICK = REDRAW
 }
 RIGHTBUTTON
  {
    BUTTONCLICK = REVERTTOSELECT
  }
}
DATA
{
 NUMSMOOTHPASSES = 20
}
SHOWSTATUSLINE = NO
```

$!INVERSEDISTINTERPOLATE

Syntax: `$!INVERSEDISTINTERPOLATE`
`DESTINATIONZONE =` <integer>
`[optional parameters]`

Description: Interpolate selected variables from one or more zones onto a destination zone using the inverse distance method.

Required Parameter

Parameters	Syntax	Default	Notes
DESTINATIONZONE	= <integer>		Zone to which to interpolate.

Optional Parameters

Parameters	Syntax	Default	Notes
INTERPNPOINTS	= <integer>	8	
INTERPPTSELECTION	= <interpptselection>	OCTANTNPOINTS	
INVDISTEXPONENT	= <dexp>	3.5	
INVDISTMINRADIUS	= <dexp>	0.0	
SOURCEZONES	= <set>	All zones except destination zone.	
VARLIST	= <set>	All variables except spatial variables.	Choose the variables to interpolate. The spatial variables (X, Y and Z if 3D) are not allowed.

Example: Interpolate variables 7-10 from zone 4 to zone 2:

```
$!INVERSEDISTINTERPOLATE
SOURCEZONES     = [4]
DESTINATIONZONE = 2
VARLIST       = [7-10]
```

Syntax: `$!ISOSURFACEATTRIBUTES [<group>]`
`[optional parameters]`

Description: A SetValue command which changes attributes associated with iso-surfaces.The optional group parameter can range from 1-8 and defaults to 1 when absent.

Optional Parameters

Parameter	Syntax	Default	Notes
SHOWGROUP	= <boolean>	YES	
ISOSURFACESELECTION	= <isosurfaceselection>	ONESPECIFIC VALUE	
ISOVALUE1	= <double>	1 x 10^{150}	
ISOVALUE2	= <double>	1 x 10^{150}	
ISOVALUE3	= <double>	1 x 10^{150}	

MESH
{
LINEPATTERN
PATTERNLENGTH
SHOW
COLOR
LINETHICKNESS
MESHTYPE
}
	
	= <linepattern>
	= <dexp>
	= <boolean>
	= <color>
	= <double>
	= <meshtype>
		
		SOLID
		2
		NO
		
		0.1
		OVERLAY	

CONTOUR
{
PATTERNLENGTH
SHOW
USELIGHTINGEFFECT
CONTOURTYPE
FLOODCOLORING
LINECONTOURGROUP
COLOR
LINETHICKNESS
LINEPATTERN
}
	
	= <dexp>
	= <boolean>
	= <boolean>
	= <contourtype>
	= <contourcoloring>
	= <integer>
	= <color>
	= <double>
	= <linepattern>
		
		2
		YES
		YES
		FLOOD
		GROUP1
		1
		
		0.1
		SOLID
			PRIMARYVALUE and AVERAGECELL not allowed.

EFFECTS
{
USEVALUEBLANKING
LIGHTINGEFFECT
SURFACETRANSLUCENCY
USETRANSLUCENCY
USECLIPPLANES
}
	
	= <boolean>
	= <lightingeffect>
	= <translucency>
	= <boolean>
	= <set>
		
		YES
		GOURAUD
		50
		NO
		[1-6]	

DEFINITIONCONTOUR GROUP	= <integer>	1	Contour group from which iso-surfaces are based.
MARCHINGCUBE ALGORITHM	= *[classic or classicplus]*	CLASSICPLUS	
OBEYSOURCEZONE BLANKING	= <boolean>	NO	
OBEYCLIPPLANES	= <boolean>	YES	Clip the iso-surface by any clipping planes that intersect the iso-surface.

SHADE
{
COLOR
SHOW
USELIGHTINGEFFECT
}
	
	= <color>
	= <boolean>
	= <boolean>
		
		NO
		YES	

Example:

```
$!ISOSURFACEATTRIBUTE
  ISOSURFACESELECTION = ONESPECIFICVALUE
  ISOVALUE1 = 113.626812744
  MESH{SHOW = YES}
  MESH{COLOR = BLUE}
  MESH{LINETHICKNESS = 0.4}
  CONTOUR{SHOW = YES}
  SURFACEEFFECTS{LIGHTINGEFFECT = PANELED}
  SURFACEEFFECTS{SURFACETRANSLUCENCY = 60}
```

$!ISOSURFACELAYERS

Syntax: `$!ISOSURFACELAYERS SHOW = <boolean>`

Description: Turn iso-surfaces on or off.

Required Parameters

Parameter	Syntax	Default	Notes
SHOW	= <boolean>	NO	
SHOWMESH	= <boolean>	YES	
SHOWCONTOUR	= <boolean>	YES	
SHOWSHADE	= <boolean>	YES	
USETRANSLUCENCY	= <boolean>	YES	
USELIGHTINGEFFECT	= <boolean>	YES	

Note

When iso-surfaces are activated, they are colored using the contour variable by default. When you activate iso-surfaces via the macro language you must perform one of the following steps in order for the iso-surfaces to be visible in your final plot:

- Set the contour variable by adding the following command to your macro file (prior to calling `$!ISOSURFACELAYERS`).

  `$!GLOBALCONTOUR` *n* `VAR=`*m*

  where *n* is the contour group number and *m* is the number of the variable to use for contouring.

or

- Set **CONTOUR SHOW = NO** via the $!ISOSURFACEATTRIBUTES command. If you choose this option, you may want to turn on shading to improve the visibility of your slice.

K - O

$!KRIG

Syntax:
```
$!KRIG
DESTINATIONZONE = <integer>
[optional parameters]
```

Description: Interpolate selected variables from a set of source zones to a destination zone using the kriging

method.

Required Parameter

Parameters	Syntax	Default	Notes
DESTINATIONZONE	= <integer>		Zone to interpolate to.

Optional Parameters

Parameters	Syntax	Default	Notes
INTERPNPOINTS	= <integer>	8	
INTERPPTSELECTION	= <interpptselection>	OCTANTNPOINTS	
KRIGDRIFT	= <krigdrift>	LINEAR	
KRIGRANGE	= <dexp>	0.3	
KRIGZEROVALUE	= <dexp>	0.0	
SOURCEZONES	= <set>	All zones except the destination zone.	
VARLIST	= <set>	All variables except spatial variables.	Choose the variables to interpolate. The spatial variables (X, Y and Z if 3D) are not allowed.

Example: Krig from zones 3 and 4 onto zone 2. Only interpolate variable 7:

```
$!KRIG
SOURCEZONES  = [3, 4]
DESTINATIONZONE= 2
VARLIST      = [7]
```

$!LAUNCHDIALOG

Syntax: `$!LAUNCHDIALOG` <dialogname>
`[no parameters]`

Description: Launch a Tecplot 360 interface dialog; This command is mainly useful for the Tecplot 360 demo.

Example: Launch Tecplot 360's Macro Viewer dialog:

```
$!LAUNCHDIALOG MACROVIEWER
```

$!LIMITS

Syntax: `$!LIMITS`
`[optional parameters]`

Description: A SetValue command that sets some of the internal limits in Tecplot 360. See Chapter F: "Limits of Tecplot Focus" in the User's Manual for additional information. The `$!LIMITS` command can only be used in the Tecplot 360 configuration file.

Optional Parameters

Parameter	Syntax	Default	Notes
LODTHRESHOLDMIN FRACT	<op><double>	= 0.3	When Load on demand is set to auto-unload, set the minimum and maximum memory thresholds. The values may be from 0 to 1, where .5 corresponds to a threshold of 50%. If Tecplot 360's memory usage exceeds the maximum threshold, it continues to unload variables until it either runs out of variables or reaches the minimum threshold. These values may also be set interactively via the Performance dialog. Refer to Section 32 - 2.3 "Miscellaneous Preferences dialog" in the User's Manual for additional information.
LODTHRESHOLD MAXFRACT	<op><double>	= 0.7	
MAXAVAILABLE PROCESSORS	<op><integer>	= 0	Sets the maximum number of processors used by Tecplot 360. Some tasks can be performed in parallel, so using all available processors greatly increases performance of those tasks. By default, Tecplot 360 uses all processors available on the machine to provide the best performance in most cases. Assign a value less than the total number of available processors to limit the number of processors used by Tecplot 360 to the assigned number.
MAXPTSINALINE	<op><integer>		Maximum number of points for geometry polylines.
MAXCHRSINTEXT LABELS	<op><integer>		Maximum number of characters in text labels.
MAXNUMCONTOUR LEVELS	<op><integer>		Maximum number of contour levels.
MAXNUMPICKOBJECTS	<op><integer>		Maximum number of objects to pick.
MAXUSABLEMEMORY	<op><integer>		Limit the amount of memory used by Tecplot 360 (units of MB).
PRELOADDATATIME THRESHOLDINMS	<integer>		Sets the maximum time in milliseconds to spend pre-loading data.

Example: Increase the maximum number of contour levels allowed to 1,000:

```
$!LIMITS
MAXNUMCONTOURLEVELS = 1000
```

$!LINEARINTERPOLATE

Syntax:
```
$!LINEARINTERPOLATE
DESTINATIONZONE = <integer>
[optional parameters]
```

Description: Interpolate selected variables from a set of source zones to a destination zone using linear interpolation. The source zones cannot be I-ordered. Values assigned to the destination zone are equivalent to the results of using the probe tool in Tecplot 360.

Required Parameter

Parameters	Syntax	Default	Notes
DESTINATIONZONE	= <integer>		Zone to interpolate to.

Optional Parameters

Parameters	Syntax	Default	Notes
SOURCEZONES	= <set>	All zones except the destination zone.	
VARLIST	= <set>	All variables except spatial variables.	Choose the variables to interpolate. The spatial variables (X, Y and Z if 3D) are not allowed.

Example:

Do linear interpolation from zones 2, 3 and 4 onto zone 7. Interpolate only variables 3-7:

```
$!LINEARINTERPOLATE
SOURCEZONES     = [2-4]
DESTINATIONZONE = 7
VARLIST         = [3-7]
```

$!LINEMAP

Syntax: `$!LINEMAP [<set>]`
`[optional parameters]`

Description: A SetValue command that assigns attributes for individual Line-mappings. The <set> parameter immediately following the `$!LINEMAP` command is optional. If <set> is omitted then the assignment is applied to all Line-mappings, otherwise the assignment is applied only to the Line-mappings specified in <set>.

Optional Parameters

Parameter	Syntax	Default	Notes
ASSIGN			
{			
ZONE	= <integer>	1	
XAXISVAR	<op> <integer>	= 1	
YAXISVAR	<op> <integer>	= 2	
THETAAXISVAR	<op> <integer>		
RAXISVAR	<op> <integer>		
XAXIS	<op> <integer>	= 1	
YAXIS	<op> <integer>	= 1	
FUNCTIONDEPENDENCY	= <functiondependency>	XINDEPENDENT	
SHOWINLEGEND	= *[ALWAYS,NEVER, AUTO]*	AUTO	
SORT	<sortby>	NONE	
SORTVAR	= <integer>		
}			
BARCHARTS			
{			
SHOW	= <boolean>	YES	
COLOR	= <color>	RED	
FILLMODE	= <fillmode>	USESPECIFICCOLOR	
FILLCOLOR	= <color>	RED	
SIZE	<op> <dexp>	= 2.5	
LINETHICKNESS	<op> <dexp>	= 0.4	
}			
CURVES			
{			
CURVETYPE	= <curvetype>	LINESEG	
EXTENDEDNAME	= <string>		Only used by the Extended Curve-fit Add-on.
EXTENDEDSETTINGS	= <string>		Only used by the Extended Curve-fit Add-on.
USEWEIGHTVAR	= <boolean>	NO	
NUMPTS	<op> <integer>	= 200	
POLYORDER	<op> <integer>	= 3	
WEIGHTVAR	= <integer>	0	
INDVARMIN	<op> <dexp>	-1 x 10^{150}	
INDVARMAX	<op> <dexp>	1 x 10^{150}	
USEINDVARRANGE	= <boolean>	NO	
CLAMPSPLINE	= <boolean>	NO	
SPLINEDERIVATIVEATSTART	<op> <dexp>	= 0	
SPLINEDERIVATIVEATEND	<op> <dexp>	= 0	
}			
ERRORBARS			
{			
SHOW	= <boolean>	NO	
VAR	= <integer>		
BARTYPE	= <errorbartype>	VERT	
COLOR	= <color>	RED	
LINETHICKNESS	<op> <dexp>	= 0.1	

Parameter	Syntax	Default	Notes
SKIPPING	<op> <dexp>	= 1	Skip can be by index or distance depending on SKIPMODE.
SKIPMODE	= <skipmode>	BYINDEX	
SIZE	<op> <dexp>	= 2.5	
}			
INDICES			The indices parameter is used to restrict the range of data plotted (and which lines are plotted if the data is IJ- or IJK-ordered).
{			
IJKLINES	= <ijklines>	I	
IRANGE	<<indexrange>>	MIN=1, MAX=0, SKIP=1	
JRANGE	<<indexrange>>	MIN=1, MAX=0, SKIP=1	
KRANGE	<<indexrange>>	MIN=1, MAX=0, SKIP=1	
}			
LINES			
{			
SHOW	= <boolean>	YES	
COLOR	= <color>	RED	
LINEPATTERN	= <linepattern>	SOLID	
PATTERNLENGTH	<op> <dexp>	= 2	
LINETHICKNESS	<op> <dexp>	= 0.1	
}			
NAME	= <string>	'&DV&'	
SYMBOLS			
{			
SHOW	= <boolean>	YES	
COLOR	= <color>	RED	
FILLMODE	= <fillmode>	NONE	
FILLCOLOR	= <color>	RED	
SIZE	<op> <dexp>	= 2.5	
LINETHICKNESS	<op> <dexp>	= 0.1	
SKIPPING	<op> <dexp>	= 1	Skip can be by index or distance depending on SKIPMODE.
SKIPMODE	= <skipmode>	BYINDEX	
SYMBOLSHAPE	<<symbolshape>>	ISASCII = NO, GEOMSHAPE = SQUARE	
}			

Examples:

Example 1:

Assign variable 1 to be on the X-axis and variable 4 to be on the Y-axis for Line-mapping number 7:

```
$!LINEMAP [7]
ASSIGN
{
 XAXISVAR = 1
 YAXISVAR = 4
}
```

Example 2:

Make Error Bars red for all Line-mappings:

```
$!LINEMAP
ERRORBARS
{
 COLOR = RED
}
```

Example 3:

Set Line-mappings 3-5 to draw a polynomial curve fit of order 5:

```
$!LINEMAP [3-5]
CURVES
{
 POLYORDER = 5
 CURVETYPE = CURVFIT
}
LINES
{
 SHOW = YES
}
```

$!LINEPLOTLAYERS

Syntax: `$!LINEPLOTLAYERS`
`[optional parameters]`

Description: A SetValue command that turns on or off Line-plot layers.

Optional Parameters:

Parameter	Syntax	Default	Notes
SHOWLINES	= <boolean>	YES	
SHOWSYMBOLS	= <boolean>	NO	
SHOWBARCHARTS	= <boolean>	NO	
SHOWERRORBARS	= <boolean>	NO	Line-mapping must have an error bar variable assigned for this to have an effect.

Example: Turn on the symbols layer for line plots:

```
$!LINEPLOTLAYERS
SHOWSYMBOLS = YES
```

$!LINKING

Syntax: `$!LINKING`
`[optional parameters]`

Description: Link attributes in two or more frames so that changes to attributes of one frame effect all linked frames.

Optional Parameters

Parameter	Syntax	Default	Notes
BETWEENFRAMES			
{			
LINKCONTOURLEVELS	= <boolean>	NO	
LINKFRAMESIZEANDPOSITION	= <boolean>	NO	
LINKXAXISRANGE	= <boolean>	NO	
LINKYAXISRANGE	= <boolean>	NO	
LINKPOLARVIEW	= <boolean>	NO	
LINK3DVIEW	= <boolean>	NO	
LINKGROUP	= <integer>	1	
LINKAXISPOSITION	= <boolean>	NO	
LINKVALUEBLANKING	= <boolean>	NO	
LINKSLICEPOSITIONS	= <boolean>	NO	
LINKISOSURFACEVALUES	= <boolean>	NO	
LINKSOLUTIONTIME	= <boolean>	NO	
}			
WITHINFRAME			
{			
LINKAXISSTYLE	= <boolean>	NO	
LINKGRIDLINESTYLE	= <boolean>	NO	
LINKLAYERLINECOLOR	= <boolean>	NO	
LINKLAYERLINEPATTERN	= <boolean>	NO	
}			

Example:

The following example will set the link attribute for all frames in the layout to LINK3DVIEW:

```
$!LOOP |NUMFRAMES|
$!LINKING BETWEENFRAMES LINK3DVIEW = YES
$!FRAMECONTROL MOVETOBOTTOMBYNUMBER
$!FRAMECONTROL ATIVATETOP
$!ENDLOOP
```

$!LOADADDON

Syntax:

```
$!LOADADDON <string>
ADDONSTYLE = <addonstyle>
```

Description:

Load an add-on into Tecplot 360. The <string> is the name of the add-on to load. See Section 33 - 1 "Add-on Loading" in the User's Manual for instructions on how to specify the add-on.

Optional Parameters

Parameters	Syntax	Default	Notes
ADDONSTYLE	= <string>	V7Standard	Style of the add-on to load. This can be either V7STANDARD or V7ACTIVEX.

Example:

Load the Circle Stream add-on. It is a V7STANDARD add-on stored in a library named cstream.:

```
$!LOADADDON "cstream"
```

$!LOADCOLORMAP

Syntax: $!LOADCOLORMAP <string>
[no parameters]

Description: Load a color map file. The <string> is the name of the file to load.

Example:

```
$!LOADCOLORMAP "mycolors.map"
```

$!LOOP...$!ENDLOOP

Syntax: $!LOOP <integer>
$!ENDLOOP

Description: Process macro commands in a loop. Within the loop you may access the current loop counter using the internal macro variable |Loop|. Loops may be nested up to 10 levels deep.

Example: Process macro commands 3 times over:

```
$!LOOP 3
$!ENDLOOP
```

$!MACROFUNCTION...$!ENDMACROFUNCTION

Syntax: $!MACROFUNCTION
NAME = <string>
[optional parameters]
$!ENDMACROFUNCTION

Description: Define a macro function. All commands between a $!MACROFUNCTION and the $!ENDMACROFUNCTION are associated with the macro function NAME. These commands are not executed when they are defined but are executed when a $!RUNMACROFUNCTION command is processed. Parameters can be passed to a macro function. Use |*n*| to reference the *n*th parameter. (See $!RUNMACROFUNCTION). In the user-interface, [Crtl]-M must be pressed, before using the keyboard shortcut specified by the KEYSTROKE option. For example, if the KEYSTROKE option is set to "P", the user must press [CTRL]-M-P.

Required Parameter

Parameter	Syntax	Default	Notes
NAME	= <string>		Name of the macro function.

Optional Parameter

Parameter	Syntax	Default	Notes
KEYSTROKE	= <string>		Allows keyboard shortcuts
RETAIN	= <boolean>	NO	Set this to YES if you want Tecplot 360 to retain this macro function when the macro in which this macro function was defined terminates. If the macro function is retained then it can be called when another macro is loaded at a later time.
SHOWINMACROPANEL	= <boolean>	YES	Used only for macro functions within the tecplot.mcr file. Set this to NO if you do not want Tecplot 360 to include the macro function in Tecplot 360's **Quick Macro Panel**.

Example:

Define a macro function that redraws the active frame *n* times when <Ctrl>+M is hit and then the 'R' key is pressed, where *n* is passed to the macro function:

```
$!MACROFUNCTION
 NAME = "ABC"
 KEYSTROKE = "R"
$!LOOP |n|
$!REDRAW
$!ENDLOOP
$!ENDMACROFUNCTION
```

$!NEWLAYOUT

Syntax: `$!NEWLAYOUT`
`[no parameters]`

Description: Clear the current layout and start again.

When a new layout is created, the following steps occur:

1. All pages are deleted.
2. A new page is created.
3. A new frame is added to the page.

$!OPENLAYOUT

Syntax: `$!OPENLAYOUT` <string>
`[optional parameters]`

Description: Open and read in a new layout file. The <string> is the name of the file to open.

Optional Parameters

Parameter	Syntax	Default	Notes
ALTDATALOAD INSTRUCTIONS	= <string>	Null	Specify alternate data load instructions. Tecplot 360 data files: This is a list of filenames to use as replacements for data files referenced in the layout file. Use " to enclose file names that contain spaces or the + symbol. By default, separate file names listed in the ALTDATALOADINSTRUCTIONS are assigned to successive data sets that are referenced within a layout file. If you have a data set that references multiple data files, use the plus symbol, +, to group file names. Non-Tecplot 360 formats (including data being input via a data loader add-on): This is a list of instructions that are passed on to the loader.
APPEND	= <boolean>	NO	Set to NO if you want Tecplot 360 to delete the current layout prior to reading in the new one.

Examples:

Example 1:

Open a new layout file called abc.lay and replace the data file referenced in the layout file with t.plt:

```
$!OPENLAYOUT "abc.lay"
ALTDATALOADINSTRUCTIONS = "t.plt"
```

Example 2:

Open a new layout file called multiframe.lay and replace the first data set with t.plt and the second data set with the two files, a.plt and b.plt:

```
$!OPENLAYOUT "multiframe.lay"
ALTDATALOADINSTRUCTIONS = '"t.plt" "a.plt"+"b.plt"'
```

P - Q

$!PAGE

Syntax: `$!PAGE`
`[optional parameters]`

Description: A SetValue command that sets the paper characteristics.

Optional Parameters

Parameter	Syntax	Default	Notes
PAPERATTRIBUTES			
{			
BACKGROUNDCOLOR	= <color>	WHITE	
ISTRANSPARENT	= <boolean>	YES	
ORIENTPORTRAIT	= <boolean>	NO	
PAPERGRIDSPACING	= <papergridspacing>	HALFINCH	Set the spacing for the tick marks on the paper.
PAPERSIZE	= <papersize>	LETTER	
REGIONINWORKAREA	<<rect>>	X1=1, Y1=0.25, X2=10, Y2=8.25	Specify rectangle that must fit within the workarea. Units are in inches (that is, in the paper coordinate system).
RULERSPACING	= <paperrulerspacing>	ONEINCH	
SHOWGRID	= <boolean>	YES	
SHOWPAPER	= <boolean>	NO	
SHOWRULER	= <boolean>	NO	
}			
USESOFTWARERENDERING	= <boolean>		Use the painter's algorithm (meaning, display graphics cell-by-cell from front-to-back), instead of using OpenGL.
NAME	= <string>		Name parameter is empty until specified.

Example:

This example does the following:

- Turns off the paper grid.
- Makes the paper size CUSTOM1.
- Makes the dimensions for CUSTOM1 to be 4 by 5 inches.

```
$!PAGE
  PAPERATTRIBUTES
  {
    SHOWGRID = NO
    PAPERSIZE = CUSTOM1
    PAPERSIZEINFO
    {
      CUSTOM1
      {
       WIDTH = 4
       HEIGHT = 5
      }
    }
  }
```

See also: Section "$!GLOBALPAPER" on page 133.

$!PAGECONTROL *[Required-Control Option]*

Description: The different commands in the PAGECONTROL compound function family are described separately in the following sections.

The PAGECONTROL compound functions are:

```
$!PAGECONTROL CREATE
```

```
$!PAGECONTROL SETCURRENTTONEXT
$!PAGECONTROL SETCURRENTTOPREVIOUS
$!PAGECONTROL SETCURRENTBYNAME
$!PAGECONTROL DELETE
$!PAGECONTROL CLEAR
```

$!PAGECONTROL CREATE

Syntax: `$!PAGECONTROL CREATE`
`[no parameters]`

Description: Create a new page. The created page will include an initial frame.

$!PAGECONTROL SETCURRENTTONEXT

Syntax: `$!PAGECONTROL SETCURRENTTONEXT`
`[no parameters]`

Description: Set the next page to be the current page.

$!PAGECONTROL SETCURRENTTOPREVIOUS

Syntax: `$!PAGECONTROL SETCURRENTTOPREVIOUS`
`[no parameters]`

Description: Set the previous page to be the current page.

$!PAGECONTROL SETCURRENTBYNAME

Syntax: `$!PAGECONTROL SETCURRENTBYNAME`
`NAME = <string>`

Description: Set the current page to the page specified.

Example:

```
$!PAGECONTROL SETCURRENTBYNAME
NAME = "BANANA"
```

$!PAGECONTROL DELETE

Syntax: `$!PAGECONTROL DELETE`

Description: Delete the current page. If the command is operated on the only page, then an initial page is created with an initial frame.

$!PAGECONTROL CLEAR

Syntax: `$!PAGECONTROL CLEAR`

Description: Clears all frames in the current page and creates a default initial frame.

$!PAGEGETNAME

Syntax: $!PAGEGETNAME |MACROVAR|

Description: Action command to get the name of the current page.

$!PAGENAME

Syntax: $!PAGENAME <string>
[no parameters]

Description: Set the name of the page.

$!PAUSE

Syntax: $!PAUSE <string>
[no parameters]

Description: Stop execution of a macro and optionally display a dialog with a message. If <string> is set to "" then no dialog is displayed and the user must click in the work area to continue.

Example: Pause and display the message `This is the first example plot`:

```
$!PAUSE "This is the first example plot."
```

$!PICK *[Required-Control Option]*

Description: The different commands in the PICK compound function family are described separately in the following sections.

The PICK compound functions are:

```
$!PICK ADDATPOSITION
$!PICK ADDALL
$!PICK ADDALLINRECT
$!PICK CLEAR
$!PICK COPY
$!PICK CUT
$!PICK EDIT
$!PICK MAGNIFY
$!PICK PASTE
$!PICK POP
$!PICK PUSH
$!PICK SETMOUSEMODE
$!PICK SHIFT
```

$!PICK ADDATPOSITION

Syntax: $!PICK CHECKTOADD
X = <dexp>
Y = <dexp>
[optional parameters]

Description: Attempt to pick an object at a specific location on the paper. Does not pop or activate frames.

Required Parameters

Parameters	Syntax	Default	Notes
X	= <dexp>		X-location (in inches) relative to the left edge of the paper.
Y	= <dexp>		Y-location (in inches) relative to the top edge of the paper.

Optional Parameters

Parameters	Syntax	Default	Notes
COLLECTINGOBJECTS	= <boolean>	NO	If NO, the list of picked objects is cleared before the attempt is made to add a new object.
CONSIDERSTYLE	= <boolean>	NO	
DIGGINGFOROBJECTS	= <boolean>	NO	If YES, attempt to pick objects below any currently picked objects at this location.
IGNOREZONEOBJECTS	= <boolean>	NO	If YES, pick operations will ignore zones and pick objects such as slices, iso-surfaces and streamtraces.

Example:

Attempt to add to the list of picked objects by picking at paper location (1.0, 7.0). Do not clear the list of picked objects before picking:

```
$!PICK CHECKTOADD
X = 1.0
Y = 7.0
COLLECTINGOBJECTS = YES
```

$!PICK ADDALL

Syntax: `$!PICK ADDALL`
`[optional parameters]`

Description: Add all objects of a certain type to the list of picked objects.

Optional Parameters

Parameters	Syntax	Default	Notes
SELECTTEXT	= <boolean>	NO	Select all text objects in the active frame.
SELECTGEOMS	= <boolean>	NO	Select all geometry objects in the active frame.
SELECTFRAMES	= <boolean>	NO	Select all frames.
SELECT STREAMTRACES	= <boolean>	NO	Select all streamtrace objects in the active frame.
SELECTMAPS	= <boolean>	NO	Select all line map objects in the active frame.
SELECTZONES	= <boolean>	NO	Select all zone objects in the active frame.

Example: Add all text and geometries in the active frame to the list of picked objects:

```
$!PICK ADDALL
SELECTTEXT = YES
SELECTGEOMS = YES
```

$!PICK ADDALLINRECT

Syntax: `$!PICK ADDALLINRECT`
`X1 = <dexp>`

```
Y1 = <dexp>
X2 = <dexp>
Y2 = <dexp>
[optional parameters]
```

Description: Add objects defined within a specified region to the list of picked objects. The region is defined in terms of the paper coordinate system. Optional filters can be used to restrict the objects selected. The region is defined by the two corner points (X1, Y1) and (X2, Y2).

Required Parameters

Parameters	Syntax	Default	Notes
X1	= <dexp>		X-location (in inches) relative to the left edge of the paper.
Y1	= <dexp>		Y-location (in inches) relative to the top edge of the paper.
X2	= <dexp>		X-location (in inches) relative to the left edge of the paper.
Y2	= <dexp>		Y-location (in inches) relative to the top edge of the paper.

Optional Parameters

Parameters	Syntax	Default	Notes
COLORFILTER	= <color>	Not used.[a]	Only objects of this color will be selected.
FONTFAMILYFILTER	= <string>	Not used.[a]	Only text objects with this font will be selected.
ISBOLD	= <boolean>	NO	Only boldface text objects will be selected.
ISITALIC	= <boolean>	NO	Only italicized text objects will be selected.
GEOMFILTER	= <geomtype>	Not used.[a]	Only geometry objects of this type will be selected.
LINEPATTERNFILTER	= <linepattern>	Not used.[a]	Only geometry objects with this line pattern will be selected.
SELECTCONTOUR LABELS	= <boolean>	NO	Select all contour labels in specified region
SELECTFRAMES	= <boolean>	NO	Select all frame objects in the specified region.
SELECTGEOMS	= <boolean>	NO	Select all geometry objects in the specified region.
SELECTGRIDAREA	= <boolean>	NO	Select the grid area in specified region
SELECTMAPS	= <boolean>	NO	Select all line map objects in the specified region.
SELECT STREAMTRACES	= <boolean>	NO	Select all streamtrace objects in the specified region.
SELECTTEXT	= <boolean>	NO	Select all text objects in the specified region.
SELECTZONES	= <boolean>	NO	Select all zone objects in the specified region.

a. There is no default for this parameter. If this parameter is omitted then the corresponding filter is not used.

Example:

Pick all circles using a dashed line pattern within the rectangle bounded by the points (0, 0) and (3, 5):

```
$!PICK ADDALLINRECT
SELECTGEOMS  = YES
LINEPATTERNFILTER= DASHED
GEOMFILTER   = CIRCLE
X1           = 0
Y1           = 0
X2           = 3
Y2           = 5
```

$!PICK CLEAR

Syntax: `$!PICK CLEAR`
`[no parameters]`

Description: Delete all objects that are currently picked. (These objects cannot be retrieved.)

Example:

```
$!PICK CLEAR
```

$!PICK COPY

Syntax: `$!PICK COPY`
`[no parameters]`

Description: Copy all objects that are currently picked to the paste buffer.

Example:

```
$!PICK COPY
```

$!PICK CUT

Syntax: `$!PICK CUT`
`[no parameters]`

Description: Copy all objects that are currently picked to the paste buffer and then delete them.

Example:

```
$!PICK CUT
```

$!PICK EDIT

Syntax: `$!PICK EDIT`
`[parameters]`

Description: Perform a global edit operation on the currently picked objects. Only one edit operation is allowed per `$!PICK EDIT` command. Objects are edited only if the supplied parameter is relevant. Actions taken using the **Quick Edit** dialog in Tecplot 360 generate these commands.

Parameters

Must select one from this table.

Parameters	Syntax	Default	Notes
ARROWHEADANGLE	= <dexp>		Angle is in degrees.
ARROWHEADATTACHMENT	= <arrowheadattachment>		
ARROWHEADSIZE	= <dexp>		Value is in Y-frame units (0-100).
ARROWHEADSTYLE	<arrowheadstyle>		
ASCIICHAR	= <string>		
BARCHARTS			Only operates on XY line mapping objects.
{			

Parameters	Syntax	Default	Notes
SHOW	= <boolean>		
ISFILLED	= <boolean>		
}			
COLOR	= <color>		
CONTOUR			Only operates on 2D or 3D zone objects.
{			
SHOW	= <boolean>		
CONTOURTYPE	= <contourtype>		
}			
CURVES			Only operates on XY line mapping objects.
{			
CURVETYPE	= <curvetype>		
}			
EDGELAYER			Only operates on 2D or 3D zone objects.
{			
SHOW	= <boolean>		
SUBBOUNDARY	= <subboundary>		
}			
ERRORBARS			Only operates on XY line mapping objects.
{			
SHOW	= <boolean>		
BARTYPE	= <errorbartype>		
}			
FILLCOLOR	= <color>		
FONTFAMILY	= <string>		
GEOMSHAPE	= <geomshape>		Applies only to scatter symbols or XY-plot symbols.
ISBOLD	= <boolean>		
ISITALIC	= <boolean>		
LINEPATTERN	= <linepattern>		
LINES			Only operates on XY line mapping objects.
{			
SHOW	= <boolean>		
}			
LINETHICKNESS	= <dexp>		Value is in Y-frame units (0-100).
MESH			Only operates on 2D or 3D zone objects.
{			
SHOW	= <boolean>		
MESHTYPE	= <meshtype>		Only operates on 2D or 3D zone objects.
}			
OBJECTALIGN	= <objectalign>		Only allowed if selected objects are all text and/or geometries.
PATTERNLENGTH	= <dexp>		Value is in Y-frame units (0-100).
SCATTER			Only operates on 2D or 3D zone objects.
{			
SHOW	= <boolean>		
FILLMODE	= <fillmode>		

Parameters	Syntax	Default	Notes
}			
SHADE			Only operates on 2D or 3D zone objects.
{			
SHOW	= <boolean>		
SHADETYPE	= <shadetype>		
}			
SHOWBORDER	= <boolean>		Only operates on frame objects.
SIZE	= <dexp>		Value is in Y-frame units. This applies to things like symbols.
SYMBOLS			Only operates on line mapping objects.
{			
SHOW	= <boolean>		
ISFILLED	= <boolean>		
}			
TEXTCOLOR	= <color>		
TEXTHEIGHTBYPERCENT	= <dexp>		Value is in Y-frame units (0-100).
TEXTHEIGHTBYPOINTS	= <dexp>		Value is in points.
VECTOR			Only operates on 2D or 3D zone objects.
{			
SHOW	= <boolean>		
VECTORTYPE	= <vectortype>		
}			

Examples:

Example 1:

Set all picked objects to use the color yellow:

```
$!PICK EDIT
COLOR = YELLOW
```

Example 2:

Set all picked objects to use the dashed line pattern:

```
$!PICK EDIT
LINEPATTERN = DASHED
```

Example 3:

Set all picked objects (which are zones) to use the contour plot type of flooding:

```
$!PICK EDIT
CONTOUR {CONTOURTYPE = FLOOD}
```

$!PICK MAGNIFY

Syntax: $!PICK MAGNIFY
MAG = <dexp>

Description: Magnify all picked objects. The objects will also be translated proportional to the distance between their anchor position and the anchor position of the first object picked.

Example: Magnify all objects by 1.5:

```
$!PICK MAGNIFY
MAG = 1.5
```

$!PICK PASTE

Syntax: `$!PICK PASTE`
`[no parameters]`

Description: Paste the currently picked objects from the paste buffer to the work area.

$!PICK POP

Syntax: `$!PICK POP`
`[no parameters]`

Description: Change the order in which objects are drawn by popping the currently picked objects to the front. Only frames, text, geometries, and the grid area for 2D plots are allowed.

$!PICK PUSH

Syntax: `$!PICK PUSH`
`[no parameters]`

Description: Change the order in which objects are drawn by pushing the currently picked objects back. Only frames, text, geometries, and the grid area for 2D plots are allowed.

$!PICK SETMOUSEMODE

Syntax: `$!PICK SETMOUSEMODE`
`MOUSEMODE` = <mousemode>

Description: Prepare to pick objects by setting the mouse mode to `SELECT`, `ADJUST`, or `ADVANCEADJUST`. `ADVANCEADJUST` is a combination of `SELECT` and `ADJUST` that allows an object's control points to be adjusted by dragging, or the entire object to be selected by clicking away from the control points. This command also clears the list of picked objects (that is, unpicks all picked objects).

Required Parameter

Parameter	Syntax	Default	Notes
MOUSEMODE	= <mousemode>		Set to SELECT or ADJUST.

Example: Set the mouse mode so picked objects are adjusted:

```
$!PICK SETMOUSEMODE
MOUSEMODE = ADJUST
```

$!PICK SHIFT

Syntax: $!PICK SHIFT
X = <dexp>
Y = <dexp>
[optional parameters]

Description: Shift the currently picked objects. Objects are shifted relative to their starting position. X and Y shift amounts are in paper units (inches). If snapping is in effect then it is applied after shifting in X and Y. (See the SetValue commands $!GLOBALFRAME SNAPTOGRID and $!GLOBALFRAME SNAPTOPAPER.)

Required Parameters

Parameters	Syntax	Default	Notes
X	= <dexp>		Shift amount in the X-direction. Units are inches.
Y	= <dexp>		Shift amount in the Y-direction. Units are inches.

Optional Parameter

Parameters	Syntax	Default	Notes
POINTERSTYLE	= <pointerstyle>	ALLDIRECTIONS	Only frames and non-3D grid area objects can use a pointer style that is not ALLDIRECTIONS.

Example: Shift the currently picked objects 1 inch to the right and 2 inches down:

```
$!PICK SHIFT
X = 1
Y = 2
```

$!PLOTOPTIONS

Syntax: $!PLOTOPTIONS = <boolean>

Description: Change the plot option between subdividing all cells, or using a quicker algorithm.

Optional Parameters

Parameters	Syntax	Default	Notes
SUBDIVIDEALLCELLS	= <boolean>	NO	If YES, divides all non-triangular, non-tetrahedral cells of all zone types when contouring, probing and creating iso-surfaces and slices. This option only affects IJ- and IJK- ordered plots. If NO, uses quicker "marching cubes" style algorithm, but generates holes in the iso-surfaces at certain saddle points.

Example: Use the following command to subdivide all volume cells:

```
$!PLOTOPTIONS
      SUBDIVIDEALLCELLS = YES
```

$!PLOTTYPE

Syntax: $!PLOTTYPE = <plottype>
[no parameters]

Description: Changes plot types between valid Tecplot 360 modes such as XYLine and Cartesian2D. Valid

options shown below.

Required Parameters

Parameter	Syntax	Default	Notes
PLOTTYPE	= <plottype>	CARTESIAN3D	

Example: Change the plot style to show a polar plot:

```
$!PLOTTYPE = POLARLINE
```

$!POLARAXIS

Syntax: $!POLARAXIS
[optional parameters]

Description: A SetValue command that assigns attributes for axes in a polar frame.

Optional Parameters

Parameter	Syntax	Default	Notes
GRIDAREA	<<areastyle>>	See Notes	DRAWBORDER=YES, ISFILLED=NO, FILLCOLOR=WHITE, DRAWGRIDLAST=NO
PRECISEGRID	<<precisegrid>>		INCLUDE=NO, SIZE=0.0045, COLOR=BLACK
PRESERVEAXISSCALE	<boolean>	YES	
RDETAIL	<<axisdetail>>		
THETADETAIL	<<axisdetail>>		
THETAMODE	= <thetamode>	DEGREES	
THETAPERIOD	= <double>	360	
VIEWPORTPOSITION	<<rect>>	See Notes	X1=0, Y1=0, X2=100, Y2=100
VIEWPORTSTYLE	<<areastyle>>	See Notes	DRAWBORDER=NO, COLOR=BLACK, LINETHICKNESS=0.4, ISFILLED=NO, FILLCOLOR=WHITE

Example: Set the Theta range, in Radians, from Pi to -Pi.

```
$!POLARAXIS THETAMODE = RADIANS
$!POLARAXIS THETAPERIOD = 6.28318530718
$!POLARAXIS THETADETAIL{VALUEATORIGIN = 0}
$!POLARAXIS THETADETAIL{RANGEMIN = -3.14159265359}
```

$!POLARTORECTANGULAR

Syntax: $!POLARTORECTANGULAR <set>
[no parameters]

Description: Treat the variables currently assigned to X and Y as referring to R and θ and convert them to X and Y. In 3D, X, Y and Z refer to R, θ, and ψ. Tecplot 360 has addition capabilities for transforming coordinates, please see $!TRANSFORMCOORDINATES.

Example: Convert zones 1, 2 and 3 from polar to rectangular:

```
$!POLARTORECTANGULAR [1-3]
```

$!POLARVIEW

Syntax: `$!POLARVIEW`
`[optional parameters]`

Description: Sets the viewing style for polar plots in a layout.

Required Parameters

Parameter	Syntax	Default	Notes
EXTENTS	<<rect>>	X1=-1.29771, Y1=-1.15352, X2=1.29771, Y2=1.15352	View extents of transformed X & Y in polar plots. Numbers listed are in the form of grid units.

Example: Set the view of the polar plot to view the full extents of the plot area.

```
$!POLARVIEW
 EXTENTS
 {
 X1=10
 Y1=10
 X2=90
 Y2=90
 }
```

$!PRINT

Syntax: `$!PRINT`
`[no parameters]`

Description: Print the current layout to a printer or send the print instructions to a file. Use the `$!PRINTSETUP` SetValue command to configure printing.

Example:

```
$!PRINT
```

$!PRINTSETUP

Syntax: `$!PRINTSETUP`
`[optional parameters]`

Description: A SetValue command that sets the attributes for printing. Use `$!PRINT` to do the actual printing. See $!EXPORTSETUP and $!EXPORT if you intend to create image files destined for desktop publishing programs.

Optional Parameters

Parameter	Syntax	Default	Notes
DRIVER	= <printerdriver>		Only applies if using the Tecplot 360 printer drivers. See $!INTERFACE USETECPLOTPRINT.
FORCEEXTRA3D SORTING	= <boolean>		
JOBCONTROL			These strings contain characters to be sent at the beginning and ending of a print file. These strings most often contain escape sequences used to switch modes on the printer. Non-printable characters can be inserted. Use ^nnn to insert a character with ordinal value nnn. Use \ to force the character after the \ to be inserted. Use $B for a Backspace, $E for Esc, $C for a carriage return, and $X for the Delete key.
{			
POSTMOPUPSTR	= <string>		
LGMOPUPSTR	= <string>		
POSTSETUPSTR	= <string>		
LGSETUPSTR	= <string>		
}			
IMAGERESOLUTION	= <integer>		
NUMHARDCOPYCOPIES	<op> <integer>		Applies only when DRIVER = PS.
NUMLIGHTSOURCESHADES	= <integer>		
PALETTE	= <palette>		Must choose options valid for current DRIVER setting.
PRECISION	<op> <integer>		Applies only if EXPORTFORMAT is PS, EPS, or RASTERMETAFILE.
PRINTFNAME	= <string>		Name of the file to write to if SENDPRINTTOFILE is YES.
PRINTRENDERTYPE	= <printrendertype>		
RGBLEGENDOUTPUT RESOLUTION	= <integer>	50	Determines the number of triangles which compose the bottom layer of the RGB Legend. This option is only available through macro language (for example, the config file)
SENDPRINTTOFILE	= <boolean>		If YES then PRINTFNAME is name of file to write to.
SPOOLER			These strings contain the system command needed to send a file to the print spooler on your computer. Use the @ symbol as a place holder for where you normally insert the name of the file to be printed. For security reasons these commands can only be used in the Tecplot 360 configuration file.
{			
PSMONOSPOOLCMD	= <string>		
PSCOLORSPOOLCMD	= <string>		
LGSPOOLCMD	= <string>		
}			
USEISOLATIN1FONTS-INPS	= <boolean>		Use extended ISO-Latin1 fonts when generating PostScript® output using Tecplot 360's internal PostScript driver.

Example:

This example does the following:

- Instruct Tecplot 360 to send print output to the print spooler.
- Sets the spooler command for monochrome PostScript to be `lpr @`.
- Sets the print driver to be monochrome PostScript.

```
$!PRINTSETUP
SENDPRINTTOFILE = NO
DRIVER = PS
PALETTE = MONOCHROME
SPOOLER
{
 PSMONOSPOOLCMD = "lpr @"
}
```

$!PROMPTFORFILENAME

Syntax: `$!PROMPTFORFILENAME` <macrovar>
`DIALOGTITLE =` <string>
`DEFAULTFNAME =` <string>
`FILEFILTER =` <string>

Description: Instruct Tecplot 360 to launch a file selection dialog. The resulting file name will be placed in <macrovar>. If the user cancels out of the dialog then <macrovar> will be empty (see the example below).

Optional Parameter

Parameter	Syntax	Default	Notes
DIALOGTITLE	= <string>	Null	Include a title at the top of the dialog.
DEFAULTFNAME	= <string>	Null	Make the dialog come up with a default file name.
FILEFILTER	= <string>	Null	Set the filter for the file selection dialog.
FILEMUSTEXIST	= <string>	YES	

Example: Prompt the user for the name of a file to delete:

```
$!PROMPTFORFILENAME|filetodelete|
 DIALOGTITLE = "Delete File"
 FILEFILTER = "*.*"
$!IF "|filetodelete|" != ""
 $!IF |OPSys| = 1 # UNIX/Mac
    $!System "rm |filetodelete|"
 $!Endif
 $!IF |OPSys| = 2 # Windows
    $!System "cmd /c del |filetodelete|"
 $!Endif
$!Endif
```

$!PROMPTFORTEXTSTRING

Syntax: `$!PROMPTFORTEXTSTRING` <macrovar>
`INSTRUCTIONS =` <string>

Description: Instruct Tecplot 360 to launch a dialog containing a single line text field and optional instructions. The user enters text into the text field and the resulting string is assigned to <macrovar>.

Optional Parameter

Parameter	Syntax	Default	Notes
INSTRUCTIONS	= <string>	Null	Include text at the top of the dialog to instruct the user regarding the value to enter. On Windows platforms, this is limited to three lines of text.

Example:

```
$!PROMPTFORTEXTSTRING |timestring|
 INSTRUCTIONS = "Enter the time of the experiment"
```

$!PROMPTFORYESNO

Syntax: `$!PROMPTFORYESNO` <macrovar>
`INSTRUCTIONS =` <string>

Description: Instruct Tecplot 360 to launch a dialog containing two buttons, one labeled Yes and the other No. The <macrovar> is assigned the string Yes or No depending on the selection.

Optional Parameter

Parameter	Syntax	Default	Notes
INSTRUCTIONS	= <string>	Null	Include text at the top of the dialog with instructions.

Example:

```
$!PROMPTFORYESNO |goforit|
 INSTRUCTIONS = "Do you want to go for it?"
$!IF "|goforit|" == "YES"
   ... code that goes for it....
$!ENDIF
```

$!PROPAGATELINKING

Syntax: `$!PROPAGATELINKING`
[optional parameters]

Description: Link multiple frames, either within frame or between frames.

Optional Parameter

Parameter	Syntax	Default	Notes
FRAMECOLLECTION	= *[ALL, PICKED]*		
LINKTYPE	= *[WITHINFRAME, BETWEENFRAMES]*		

Example:

```
$!PROPAGATELINKING
LINKTYPE = BETWEENFRAMES
FRAMECOLLECTION = ALL
```

$!PUBLISH

Syntax: `$!PUBLISH` <string>

Description: Create an HTML file displaying one or more images. A linked layout with packaged data may be included. You must provide the file name.

Optional Parameter

Parameter	Syntax	Default	Notes
IMAGESELECTION	= <imagestyle>	ONEPERFRAME	Choosing ONEPERFRAME will create one image per frame, selecting WORKSPACEONLY creates one image which includes all your frames.
INCLUDELAYOUTPACKAGE	= <boolean>	No	Choose YES to create a linked layout file.

Example:

```
$!PUBLISH "C:\TEC360\separate.html"
INCLUDELAYOUTPACKAGE = NO
IMAGESELECTION = ONEPERFRAME
```

$!QUIT

Syntax: `$!QUIT`

Description: Terminate the execution of the Tecplot 360 program.

Example:

```
$!QUIT
```

R

$!RAWCOLORMAP

Syntax: `$!RAWCOLORMAP`
<colormaprawdata>

Description: Assign the RGB values that define the Raw user-defined color map. This does not set the color map to use the Raw user-defined color map. Use `$!COLORMAP` to set the current color map.

Required Parameter

Parameter	Syntax	Default	Notes
<colormaprawdata>			This is a list of RGB values.

Example: Assign the Raw user-defined color map to a gray scale using 11 colors:

```
$!RAWCOLORMAP
RAWDATA
11
0      0      0
25     25     25
50     50     50
75     75     75
100   100     100
125    125    125
150    150    150
175    175    175
```

```
200    200    200
225    225    225
255    255    255
```

$!READDATASET

Syntax: `$!READDATASET` <string>
`[optional parameters]`

Description: The $!READDATASET macro command has two separate uses. The parameters available for the command are dependent upon the intended use. It may either be used to load data in Tecplot 360's file format (*.*plt* or *.*dat*) or in a foreign data file format. To load data in Tecplot 360's file format, use the parameters listed in Table 9 - 2. To load data in a foreign file format, use the parameters listed in Table 9 - 1 along with a set of name/value pairs. The name/value pairs are specific to the data loader and described in Chapter 4: "Data Loaders" in the User's Manual.

Examples:

FLUENT® Loader Example:

The following example loads one case file and one data file with the FLUENT file loader. Note that the DATASETREADER parameter is at the end of the command call.

```
$!READDATASET
'"STANDARDSYNTAX" "1.0"
"LoadOption" "MultipleCaseAndData"
"FILELIST_Files" "2" "triangular.cas" "triangular.dat"
"UnsteadyOption" "ReadTimeFromDataFiles"
"AssignStrandIDs" "Yes"
"GridZones" "CellsAndBoundaries"
"IncludeParticleData" "Yes"
"AverageToNodes" "Yes"
"AveragingMethod" "Arithmetic"'
DATASETREADER = 'Fluent Data Loader'
```

Ensight Loader Example

The following example loads one Ensight case file. Note that the DATASETREADER parameter is at the end of the command call.

```
$!READDATASET
'"STANDARDSYNTAX" "1.0"
"FILENAME_CASEFILE" "wing.case"
"ISkip" "1"
"JSkip" "1"
"KSkip" "1"'
DATASETREADER = 'EnSight Loader'
```

Table 9 - 1: Parameters for loading data in a foreign file format

Parameters	Syntax	Default	Notes
DATASETREADER	= <string>		Used to specify an alternate data reader for Tecplot 360.

Table 9 - 2: Parameters for loading data in Tecplot 360 format

Parameters	Syntax	Default	Notes
ADDZONETOEXISTING STRANDS	= <boolean>	NO	If YES, Tecplot 360 will add the zones from the appended data to any existing strands in the dataset. If NO, Tecplot 360 will append the strands from the appended data to any existing strands in the dataset.
ASSIGNSTRANDID	= <boolean>	NO	If YES, Tecplot 360 will assign strand ID's to zones if time is supplied for the zones but strand ID's are not. If NO, Tecplot 360 will not associate these zones with any strands.

Table 9 - 2: Parameters for loading data in Tecplot 360 format

Parameters	Syntax	Default	Notes
IJKSKIP			Use values greater than 1 to skip data points.
{			
I	= <integer>	1	
J	= <integer>	1	
K	= <integer>	1	
}			
COLLAPSEZONESANDVARS	= <boolean>	NO	Renumber zones and variables if zones or variables are disabled.
INCLUDECUSTOMLABELS	= <boolean>	YES	Set to YES to load in any custom labels in the data files.
INCLUDEDATA	= <boolean>	YES	Set to YES to load in any field data in the data files.
INCLUDEGEOM	= <boolean>	YES	Set to YES to load in any geometries in the data files.
INCLUDETEXT	= <boolean>	YES	Set to YES to load in any text in the data files.
INITIALPLOTFIRSTZONEONLY	= <boolean>		Allows faster performance for files with multiple zones.
INITIALPLOTTYPE	= <plottype>		
READDATAOPTION	= <readdataoption>	NEW	Set to APPEND to append the new zones to the zones in the data set that existed prior to using this command. Set to NEW to remove the data set from the active frame prior to reading in the new data set. If other frames use the same data set they will continue to use the old one. Set to REPLACE to replace the data set attached to the active frame and to all other frames that use the same data set, with the new data set.
RESETSTYLE	= <boolean>	YES	Set to NO if you want Tecplot 360 to keep the current style. This only applies if READDATA OPTION is not APPEND.
VARLOADMODE	= <varloadmode>	BYPOSITION	Set to BYPOSITION to load variables based on their position in the file. Set to BYNAME to load variables based on their name. If set to BYNAME, then VARNAMELIST must be supplied as well.
VARNAMELIST	= <string>		Use this to list the names of the variables to load into Tecplot 360. Names separated by a ; or a + are joined together to form a set of aliases for a given variable.
VARPOSITIONLIST	= <set>	All vars.	Use this to reduce the number of variables loaded.
ZONELIST	= <set>	All zones.	Use this to reduce the number of zones loaded.

Example 1:

Read in the data files `t1.plt` and `t2.plt` to form a single data set in Tecplot 360:

```
$!READDATASET "t1.plt t2.plt"
```

Example 2:

Read in the datafile `t1.plt`. Only read in zones 1 and 4. Skip over every other I-index:

```
$!READDATASET "t1.plt"
ZONELIST = [1,4]
IJKSKIP
{
 I = 2
}
```

Example 3:

Read in the data files `t1.plt`, `t2.plt`, and `t3.plt`. Append the new data set to the current one:

```
$!READDATASET "t1.plt t2.plt t3.plt"
READDATAOPTION = APPEND
```

Example 4:

Read in the data files `t1.plt` and `t2.plt` from directory, `/users/john/testrun7/runb`:

```
$!VARSET |BASEDIR| = "/users/john/testrun7/runb"
$!READDATASET "|basedir|/t1.plt |basedir|/t2.plt"
```

$!READSTYLESHEET

Syntax: `$!READSTYLESHEET` <string>
`[optional parameters]`

Description: Read in a stylesheet file. The <string> is the name of the file to read.

Optional Parameters

Parameters	Syntax	Default	Notes
INCLUDEAUXDATA	= <boolean>	YES	Set to YES to read auxiliary data.
INCLUDECONTOURLEVELS	= <boolean>	YES	Set to YES to read in all contour levels.
INCLUDEFRAMESIZEANDPOSITION	= <boolean>	NO	Set to YES if you want the active frame to be sized and positioned exactly like the frame used to create the stylesheet.
INCLUDEGEOM	= <boolean>	YES	Set to YES to load in any geometries in the stylesheet file.
INCLUDEPLOTSTYLE	= <boolean>	YES	Set to YES to process commands related to plot style (mesh color, vector type, and so on).
INCLUDESTREAMPOSITIONS	= <boolean>	YES	Set to YES to read in streamtrace starting positions.
INCLUDETEXT	= <boolean>	YES	Set to YES to load in any text in the stylesheet file.
MERGE	= <boolean>	NO	Set to NO to reset all frame attributes back to their factory defaults prior to reading in the stylesheet.

Example: Read the stylesheet file `t.sty`. Do not read in any text or geometries:

```
$!READSTYLESHEET "t.sty"
INCLUDETEXT     = NO
INCLUDEGEOM     = NO
```

$!REDRAW

Syntax: `$!REDRAW`
`[optional parameters]`

Description: Redraw the active frame.

Optional Parameter

Parameter	Syntax	Default	Notes
DOFULLDRAWING	= <boolean>	YES	Set to NO to draw only a "trace" of the data in the frame.

Example:

```
$!REDRAW
```

$!REDRAWALL

Syntax: $!REDRAWALL
[optional parameters]

Description: Redraw all frames.

Optional Parameter

Parameter	Syntax	Default	Notes
DOFULLDRAWING	= <boolean>	YES	Set to NO to draw only a "trace" of the data in each frame.

Example:

```
$!REDRAWALL
```

$!REMOVEVAR

Syntax: $!REMOVEVAR <macrouserdefvar>

Description: Remove a user-defined macro variable. This frees up space so another user-defined macro variable can be defined.

Example: Remove the macro variable |ABC|:

```
$!REMOVEVAR |ABC|
```

$!RENAMEDATASETVAR

Syntax: $!RENAMEDATASETVAR
VAR = <integer>
NAME = <string>
[no optional parameters]

Description: Rename a data set variable in Tecplot 360.

Required Parameters

Parameter	Syntax	Default	Notes
VAR	= <integer>		Specify the variable number.
NAME	= <string>		Specify the new variable name.

Example: Rename variable 1 to be Banana:

```
$!RENAMEDATASETVAR
VAR = 1
NAME = "Banana"
```

$!RENAMEDATASETZONE

Syntax:
```
$!RENAMEDATASETZONE
ZONE = <integer>
NAME = <string>
[no optional parameters]
```

Description: Rename a data set zone in Tecplot 360.

Required Parameters

Parameter	Syntax	Default	Notes
ZONE	= <integer>		Specify the zone number.
NAME	= <string>		Specify the new zone name.

Example: Rename zone 1 to be Banana:

```
$!RENAMEDATASETZONE
ZONE = 1
NAME = "Banana"
```

$!RESET3DAXES

Syntax:
```
$!RESET3DAXES
[no parameters]
```

Description: Reset the ranges on the 3D axes.

Example:

```
$!RESET3DAXES
```

$!RESET3DORIGIN

Syntax:
```
$!RESET3DORIGIN
[optional parameters]
```

Description: Reposition the rotation origin in 3D to be at the specified location.

Optional Parameter

Parameter	Syntax	Default	Notes
ORIGINRESETLOCATION	= <originresetlocation>		

Example:

```
$!RESET3DORIGIN
 ORIGINRESETLOCATION = DATACENTER
```

$!RESET3DSCALEFACTORS

Syntax: $!RESET3DSCALEFACTORS
[no parameters]

Description: Recalculate the scale factors for the 3D axes. Aspect ratio limits are taken into account.

Example:

```
$!RESET3DSCALEFACTORS
```

$!RESETVECTORLENGTH

Syntax: $!RESETVECTORLENGTH
[no parameters]

Description: Reset the length of the vectors. Tecplot 360 will find the vector with the largest magnitude and set the scaling factor so it will appear on the screen using the length specified by $!FRAMESETUP VECTDEFLEN.

Example:

```
$!RESETVECTORLENGTH
```

$!ROTATE2DDATA

Syntax: $!ROTATE2DDATA
ANGLE = <dexp>
[optional parameters]

Description: Rotate field data in 2D about any point.

Required Parameter

Parameter	Syntax	Default	Notes
ANGLE	= <dexp>		Specify angle of rotation in degrees.

Optional Parameters

Parameter	Syntax	Default	Notes
ZONELIST	= <set>	All zones.	Zones to rotate.
X	= <dexp>	0	X-origin to rotate about.
Y	= <dexp>	0	Y-origin to rotate about.

Example: Rotate zone 3 30 degrees about the point (7, 2):

```
$!ROTATE2DDATA
ANGLE    = 30
ZONELIST = [3]
X        = 7
Y        = 2
```

$!ROTATE3DVIEW

Syntax: `$!ROTATE3DVIEW` <rotateaxis>
`ANGLE =` <dexp>
`[optional parameters]`

Description: Do a 3D rotation about a given axis. The <rotateaxis> must be supplied.

Required Parameter

Parameter	Syntax	Default	Notes
ANGLE	= <dexp>		Angle to rotate (in degrees).

Optional Parameter

Parameter	Syntax	Default	Notes
ROTATEORIGIN LOCATION	= <rotateoriginlocation>		
VECTORX	= <dexp>		Required when rotate axis is ABOUTVECTOR.
VECTORY	= <dexp>		Required when rotate axis is ABOUTVECTOR.
VECTORZ	= <dexp>		Required when rotate axis is ABOUTVECTOR.

Example:

```
$!ROTATE3DVIEW PSI
ANGLE = 10
```

$!RUNMACROFUNCTION

Syntax: `$!RUNMACROFUNCTION` <string> *[*<macroparameterlist>*]*

Description: Execute commands defined in a macro function. The <string> references the name of the macro function to run. If the macro command requires parameters, then include them (within parentheses) after the macro command name.

Example:

Run macro function XYZ and pass the value 7 as the first parameter and the value 3.5 as the second parameter:

```
$!RUNMACROFUNCTION "XYZ" (7,3.5)
```

S

$!SAVELAYOUT

Syntax: $!SAVELAYOUT <string>
[optional parameters]

Description: Save the current layout to a file. You must supply the file name.

Optional Parameter

Parameters	Syntax	Default	Notes
INCLUDEDATA	= <boolean>	NO	If YES, a layout package file will be created. The extension .lpk is recommended.
INCLUDEPREVIEW	= <boolean>	YES	Applies only if INCLUDEDATA is YES.
USERELATIVEPATHS	= <boolean>	NO	If YES, all files referenced in the layout file will use relative paths.

Example: Save the current layout to a file called ex1.lay:

```
$!SAVELAYOUT "ex1.lay"
```

$!SET3DEYEDISTANCE

Syntax: $!SET3DEYEDISTANCE
EYEDISTANCE = <dexp>

Description: Sets the distance from the viewer to the plane of the current center of rotation.

Example:

```
$!SET3DEYEDISTANCE
EYEDISTANCE = 13.5
```

$!SETAUXDATA

Syntax: $!SETAUXDATA
AUXDATALOCATION = [zone/var/dataset/frame/linemap]
NAME = <string>
VALUESTRING = <string>
[optional parameters]

Description: Add Auxiliary Data in the form of name/value pairs to zones, frames or datasets. The name must begin with an underscore or letter, and may be followed by one or more underscore, period, letter, or digit characters.

Required Parameters

Parameter	Syntax	Default	Notes
AUXDATALOCATION	= *[zone/var/ dataset/frame/ linemap|page]*		
NAME	= <string>		
VALUESTRING	= <string>		

Optional Parameters

Parameter	Syntax	Default	Notes
MAP	= <integer>		Only required if AUXDATALOCATION = linemap
VAR	= <integer>		Only required if AUXDATALOCATION = var
ZONE	= <integer>		Only required if AUXDATALOCATION = zone

Example: Set the selected Auxiliary Data to Zone 2:

```
$!SETAUXDATA
AUXDATALOCATION = zone
ZONE = 2
NAME = "VARIABLE.DATA"
VALUESTRING = "WEST SECTOR"
```

$!SETDATASETTITLE

Syntax: `$!SETDATASETTITLE` <string>
`[no optional parameters]`

Description: Set the title for the current data set.

Example:

```
$!SETDATASETTITLE "My data set"
```

$!SETFIELDVALUE

Syntax:
```
$!SETFIELDVALUE
ZONE          = <integer>
VAR           = <integer>
INDEX         = <integer>
FIELDVALUE    = <dexp>
AUTOBRANCH    = <boolean>
[no optional parameters]
```

Description: Specify a field value (data set value) at a specified point index. If the zone referenced is IJ- or IJK-ordered then the point index is calculated by treating the 2- or 3D array as a 1-D array.

Required Parameters

Parameters	Syntax	Default	Notes
AUTOBRANCH	= <boolean>		Affects shared variables only. If YES, the specified zone will no longer share that variable with the other zones. If NO, the variable will still be shared, and the change to the variable will be shown for all zones where it is shared.
FIELDVALUE	= <dexp>		
INDEX	= <integer>		
VAR	= <integer>		
ZONE	= <integer>		

Example:

A data set contains 2 zones and 3 variables. Zone 2 is dimensioned 5 by 3. Set the value for variable 3 at IJ-location (2, 2) to be 37.5:

```
$!SETFIELDVALUE
ZONE         = 2
VAR          = 3
INDEX        = 7
FIELDVALUE = 37.5
AUTOBRANCH = YES
```

Note that the INDEX value was calculated using:

```
INDEX = I + (J-1)*|MAXI| + (K-1) * |MAXI| * |MAXJ|
    = 5*(2-1)+2
    = 7
```

$!SETFRAMEBACKGROUNDCOLOR

Syntax: $!SETFRAMEBACKGROUNDCOLOR <color>

Description: Sets the frame background to the specified color and surveys all basic color assignments in Tecplot 360, converting the all basic colors using the following rules to achieve the best contrast:

1. For all line type basic colors that match the new basic frame color, set the basic line color to the best show color of the basic frame color.
2. For all fill type basic colors that match the best show color of the new basic frame color, set the fill color to the new frame color.

Exceptions:

1. For geometries and text boxes if the line and fill colors are the same and filling is active then both lines and fill follow the fill rules above.
2. For zone, slice, iso-surface, and streamtrace object types the basic color shading (i.e. fill) only follows the fill rules above if lighting effects are not being used.

$!SETSTYLEBASE

Syntax: $!SETSTYLEBASE <stylebase>
[no parameters]

Description: Instruct Tecplot 360 on how to initialize frame style values when a new frame is created. During normal operation, Tecplot 360 bases the style of a new frame on the factory defaults plus any changes assigned in the Tecplot 360 configuration file. Layout files and stylesheet files, however, rely on Tecplot 360 basing new frames only on the factory defaults. This command is typically not

used by the casual user.

Example: Set the style base for frames to use the factory defaults:

```
$!SETSTYLEBASE FACTORY
```

$!SHARECONNECTIVITY

Syntax:
```
$!SHARECONNECTIVITY
SOURCEZONE = <integer>
DESTINATIONZONE = <integer>
[no optional parameters]
```

Description: Share the nodemap between the source and destination zones, presuming that the zones are FE and have the same element type and number of nodes.

Required Parameters

Parameter	Syntax	Default	Notes
DESTINATIONZONE	= <integer>		
SOURCEZONE	= <integer>		

Example: Shares the connectivity of the second zone with the sixth zone:

```
$!SHARECONNECTIVITY
SOURCEZONE = 2
DESTINATIONZONE = 6
```

$!SHAREFIELDDATAVAR

Syntax:
```
$!SHAREFIELDDATAVAR
SOURCEZONE = <integer>
VAR = <integer>
DESTINATIONZONE = <integer>
[no optional parameters]
```

Description: Allows sharing of the specified variable from the source zone to the destination zone. Zone must be of the same type (ordered or FE) and dimensions. Cell centered variables in FE must have the same number of cells. Sharing is not allowed if either zone has global face neighbors.

Required Parameters

Parameter	Syntax	Default	Notes
DESTINATIONZONE	= <integer>		
SOURCEZONE	= <integer>		
VAR	= <integer>		

Example: Shares the third variable from the second zone, with the fifth zone:

```
$!SHAREFIELDDATAVAR
SOURCEZONE = 2
VAR    = 3
DESTINATIONZONE = 5
```

$!SHIFTLINEMAPSTOBOTTOM

Syntax: $!SHIFTLINEMAPSTOBOTTOM <set>
[no parameters]

Description: Shift a list of Line-mappings to the bottom of the Line-mapping list. This in effect causes the selected Line-mappings to be drawn last.

Example: Shift Line-mappings 2 and 4 to the bottom:

```
$!SHIFTLINEMAPSTOBOTTOM [2,4]
```

$!SHIFTLINEMAPSTOTOP

Syntax: $!SHIFTLINEMAPSTOTOP <set>
[no parameters]

Description: Shift a list of Line-maps to the top of the Line-map list. This in effect causes the selected Line-maps to be drawn first.

Example: Shift Line-maps 2 and 4 to the top:

```
$!SHIFTLINEMAPSTOTOP [2,4]
```

$!SHOWMOUSEPOINTER

Syntax: $!SHOWMOUSEPOINTER <boolean>
[optional parameters]

Description: The mouse icon may be deactivated within a macro to enhance the on-screen animation. It must be reactivated before exiting the macro.

Example:

```
$!SHOWMOUSEPOINTER NO
$!LOOP 36
 $!ROTATE3DVIEW X
    ANGLE = 5
 $!REDRAW
$!ENDLOOP
$!SHOWMOUSEPOINTER YES
```

$!SKETCHAXIS

Syntax: $!SKETCHAXIS
[optional parameters]

Description: A SetValue command that assigns attributes for axes in a sketch mode frame. Axes are rarely used in sketch frames.

Optional Parameters

Parameter	Syntax	Default	Notes
AUTOADJUSTRANGES TONICEVALEUS	= <boolean>	NO	
AXISMODE	= <axismode>	XYDEPENDENT	Set to INDEPENDENT or XYDEPENDENT.
DEPXTOYRATIO	<op> <dexp>	= 1	AXISMODE must be XYDEPENDENT to use this.
GRIDAREA	<<gridarea>>	DRAWBORDER=NO, COLOR=BLACK, LINETHICKNESS=0.4	
PRECISEGRID	<<precisegrid>>	INCLUDE=NO, SIZE=0.0045, COLOR=BLACK, ISFILLED=NO, FILLCOLOR=WHITE, DRAWGRIDLAST= NO	
PRESERVEAXISSCALE	= <boolean>	NO	
VIEWPORTNICEFIT BUFFER	= <double>		
VIEWPORTPOSITION	<<rect>>	X1=0, Y1=0, X2=100, Y2=100	
VIEWPORTTOPSNAP TARGET	= <double>	100	
VIEWPORTTOPSNAP TOLERANCE	= <double>	10	
XDETAIL	<<axisdetail>>		
YDETAIL	<<axisdetail>>		

Example: Change the axis mode to be `INDEPENDENT` for sketch mode in the active frame:

```
$!SKETCHAXIS
AXISMODE = INDEPENDENT
```

$!SLICEATTRIBUTES

Syntax: `$!SLICEATTRIBUTES [<slicegroup>]`
`[optional parameters]`

Description: A SetValue command that changes global attributes associated with slices.

Optional Parameters

Parameter	Syntax	Default	Notes
CONTOUR			
{			
LINEPATTERN	= <linepattern>	SOLID	
SHOW	= <boolean>	YES	
CONTOURTYPE	= <contourtype>	FLOOD	CORNERCELL and AVERAGECELL options not allowed for CONTOURTYPE.
COLOR	= <color>	SMRAINBOW	
LINETHICKNESS	= <double>	0.1	
USELIGHTINGEFFECT	= <boolean>	NO	
FLOODCOLORING	= <contourcoloring>	GROUP1	
LINECONTOURGROUP	= <integer>	1	
PATTERNLENGTH	= <dexp>	2	
}			
EDGELAYER			
{			
EDGETYPE		BORDERS	
SHOW	= <boolean>	NO	
COLOR	= <color>	BLACK	
LINETHICKNESS	<op> <double>	= 0.4	
IBORDER		BOTH	
JBORDER		BOTH	
KBORDER		BOTH	
}			
EFFECTS			
{			
LIGHTINGEFFECT		GOURAUD	
SURFACETRANSLUCENCY	= <integer>	10	
USETRANSLUCENCY	= <boolean>	YES	
USEVALUEBLANKING	= <boolean>	YES	
USECLIPPLANES	= <set>	[1-6]	
}			
ENDPOSITION			
{			
X	= <double>	0.95	
Y	= <double>	0.95	
Z	= <double>	0.95	
I	= <integer>	10	
J	= <integer>	10	
K	= <integer>	10	
}			
MESH			
{			
LINEPATTERN	= <linepattern>	SOLID	
PATTERNLENGTH	= <dexp>	2	
SHOW	= <boolean>	NO	
COLOR	= <color>		
LINETHICKNESS	= <double>	0.1	
MESHTYPE	= <meshtype>	OVERLAY	
}			

Parameter	Syntax	Default	Notes
NUMINTERMEDIATE SLICES	= <integer>	1	
OBEYSOURCEBLANKING	= <boolean>	NO	
CLIPPLANE	= <clipplane>	NONE	Use slice as a clipping plane, with one of the clipplane types.
OBEYCLIPPLANES	= <boolean>	YES	Clip slice by any clipping planes that intersect it.
PRIMARYPOSITION			
{			
X	= <double>	0.5	
Y	= <double>	0.5	
Z	= <double>	0.5	
I	= <integer>	5	
J	= <integer>	5	
K	= <integer>	5	
}			
SHADE			
{			
SHOW	= <boolean>	NO	
COLOR	= <color>	BLACK	
USELIGHTINGEFFECT	= <boolean>	YES	
}			
SHOWGROUP	= <boolean>	YES	
SHOWINTERMEDIATE SLICES	= <boolean>	NO	
SHOWPRIMARYSLICE	= <boolean>	YES	
SHOWSTARTENDSLICE	= <boolean>	NO	
SLICECONSTRAINT			
{			
INCLUDE	= <boolean>		
BOXDIMENSION	<<xyz>>		
ORIGIN	<<xyz>>		
}			
SLICESURFACE	= <slicesurface>	XPLANES	
STARTPOSITION			
{			
X	= <double>	0.05	
Y	= <double>	0.05	
Z	= <double>	0.05	
I	= <integer>	0	
J	= <integer>	0	
K	= <integer>	0	
}			
SURFACEEFFECTS			
{			
LIGHTINGEFFECT	= <lightingeffect>		
SURFACETRANSLUCENCY	= <translucency>		
USETRANSLUCENCY	= <boolean>		
}			
VECTOR			
{			
SHOW	= <boolean>	NO	
COLOR	= <color>	BLACK	

Parameter	Syntax	Default	Notes
ISTANGENT	= <boolean>	NO	
LINETHICKNESS	= <double>	0.1	
VECTORTYPE	= <vectortype>	TAILATPOINT	
ARROWHEADSTYLE	= <arrowheadstyle>	PLAIN	
PATTERNLENGTH	= <dexp>	2	
LINEPATTERN	= <linepattern>	SOLID	
}			

Example:

```
$!GLOBALCONTOUR VAR = 4
$!SLICEATTRIBUTES ENDPOSITION {X = 1}
$!SLICEATTRIBUTES STARTPOSITION {X = 6}
$!SLICEATTRIBUTES NUMINTERMEDIATESLICES = 6
$!SLICEATTRIBUTES SHOWSTARTENDSLICE = YES
$!SLICEATTRIBUTES SHOWINTERMEDIATESLICES = YES
$!REDRAW
$!CREATESLICEZONES
```

$!SLICELAYERS

Syntax: $!SLICELAYER SHOW = <boolean>

Description: Turn slicing on or off.

Required Parameters

Parameter	Syntax	Default	Notes
SHOW	= <boolean>	NO	
SHOWMESH	= <boolean>	YES	
SHOWCONTOUR	= <boolean>	YES	
SHOWVECTOR	= <boolean>	YES	
SHOWSHADE	= <boolean>	YES	
SHOWEDGE	= <boolean>	YES	
USETRANSLUCENCY	= <boolean>	YES	
USELIGHTINGEFFECT	= <boolean>	YES	

Note:

When slices are activated, they are colored using the contour variable by default. When you activate slices via the macro language you must perform one of the following steps in order for the slices to be visible in your final plot:

- Set the contour variable by adding the following command to your macro file (prior to calling $!SLICELAYER).

  $!GLOBALCONTOUR *n* VAR=*m*

  where *n* is the contour group number and *m* is the number of the variable to use for contouring.

or

- Set **CONTOUR SHOW = NO** via the $!SLICEATTRIBUTES command. If you choose this option, you may want to turn on shading to improve the visibility of your slice.

$!SMOOTH

Syntax: `$!SMOOTH`
`ZONE = <set>`
`VAR = <set>`
`[optional parameters]`

Description: Smooth data (reduce the spikes) for selected variables in selected zones.

Required Parameters

Parameter	Syntax	Default	Notes
ZONE	= <set>		Zones to smooth.
VAR	= <set>		Variables to smooth. These cannot be X or Y if in 2D or Z if in 3D and they must be a dependent variable in XY-plots.

Optional Parameters

Parameter	Syntax	Default	Notes
NUMSMOOTHPASSES	= <integer>	1	
SMOOTHWEIGHT	= <dexp>	0.8	
SMOOTHBNDRYCOND	= <boundarycondition>	FIXED	

Example: Smooth variable 3 in zone 2:

```
$!SMOOTH
ZONE = 2
VAR = 3
NUMSMOOTHPASSES = 5
SMOOTHBNDRYCOND = ZERO2ND
```

$!STREAMATTRIBUTES

Syntax: `$!STREAMATTRIBUTES`
`[optional parameters]`

Description: A SetValue command that changes global attributes associated with streamtraces.

Optional Parameters

Parameter	Syntax	Default	Notes
ADDARROWS	= <boolean>	YES	
ARROWHEADSIZE	<op> <dexp>	= 1.2	
ARROWHEADSPACING	<op> <double>	= 10	Distance between arrowheads in frame units.
CELLFRACTION	<op> <dexp>	= 0.25	Maximum fraction of the distance across a cell a streamtrace moves in one step. A streamtrace adjusts its step-size between CELLFRACTION and MINCELLFRACTION depending on local curvature of the streamtrace.
COLOR	= <color>	BLACK	
LINETHICKNESS	<op> <dexp>	= 0.1	
MAXSTEPS	<op> <integer>	= 10,000	
MINCELLFRACTION	<op> <dexp>	= 1×10^{-005}	Minimum fraction of the distance across a cell a streamtrace moves in one step.
OBEYSOURCEZONE BLANKING	= <boolean>	NO	
OBEYCLIPPLANES	= <boolean>	NO	Clip streamtraces by any clipping planes that intersect the streamtraces.
RODRIBBON			
{			
WIDTH	<op><dexp>	= 0.01	Value is grid units.
NUMRODPOINTS	<op> <integer>	= 3	Number of points used to define the streamrod cross-section.
MESH			
{			
SHOW	= <boolean>	NO	
COLOR	= <color>		
LINETHICKNESS	<op><dexp>	= 0.1	
MESHTYPE	= <meshtype>	OVERLAY	
LINEPATTERN	= <linepattern>	SOLID	
PATTERNLENGTH	= <dexp>	2	
}			
CONTOUR			
{			
SHOW	= <boolean>	NO	
USELIGHTINGEFFECT	= <boolean>	YES	
FLOODCOLORING	= <contourcoloring>	GROUP1	
CONTOURTYPE	= <contourtype>	FLOOD	
LINECONTOURGROUP	= <integer>	1	
LINEPATTERN	= <linepattern>	SOLID	
PATTERNLENGTH	= <dexp>	2	
LINETHICKNESS	= <dexp>	0.1	
}			
SHADE			
{			
SHOW	= <boolean>	YES	
COLOR	= <color>		
USELIGHTINGEFFECT	= <boolean>	YES	
}			
EFFECTS			
{			

Parameter	Syntax	Default	Notes
LIGHTINGEFFECT	= <lightingeffect>	GOURAUD	
SURFACETRANSLUCENCY	= <translucency>	50	
USETRANSLUCENCY	= <boolean>	NO	
USEVALUEBLANKING	= <boolean>	YES	
USECLIPPLANES	= <set>	[1-6]	
}			
}			
SHOWPATHS	= <boolean>	YES	
STREAMTIMING			
{			
SHOWDASHES	= <boolean>	NO	
SHOWMARKERS	= <boolean>	NO	
MARKCOLOR	= <color>	BLACK	
MARKSIZE	<op> <dexp>	= 1	
DASHSKIP	<op> <integer>	= 1	
MARKSYMBOL	<<symbolshape>>	ISASCII=NO, GEOMSHAPE= SQUARE	
TIMESTART	= <double>	-1 x 10^{150}	
TIMEEND	= <double>	1 x 10^{150}	
TIMEANCHOR	= <double>	0	
TIMEDELTA	= <double>	1 x 10^{150}	
}			
TERMLINE			
{			
ISACTIVE	= <boolean>	NO	
SHOW	= <boolean>	YES	
COLOR	= <color>	BLACK	
LINEPATTERN	= <linepattern>	SOLID	
PATTERNLENGTH	<op> <dexp>	= 2	
LINETHICKNESS	<op> <dexp>	= 0.1	
}			

$!STREAMTRACE [Required-Control Option]

Description: The different commands in the STREAMTRACE compound function family are described separately in the following sections.

```
The STREAMTRACE compound function family is:
$!STREAMTRACE ADD
$!STREAMTRACE DELETALL
$!STREAMTRACE DELETERANGE
$!STREAMTRACE RESETDELTATIME
$!STREAMTRACE SETTERMINATIONLINE
```

$!STREAMTRACE ADD

Syntax: `$!STREAMTRACE ADD`
`[optional parameters]`

Description: Add a single streamtrace or a rake of streamtraces to the active frame. The frame must be a 2D or

3D field plot.

Optional Parameters

Parameters	Syntax	Default	Notes
ALTSTARTPOS			This is required if NUMPTS is greater than 1 or if the streamtype is a volume rod or volume ribbon.
{			
X	= <dexp>	0.0	
Y	= <dexp>	0.0	
Z	= <dexp>	0.0	
}			
DIRECTION	= <streamdirection>	FORWARD	
DISTRIBUTIONREGION	= <streamdistributionregion>		If not present, use NUMPTS to decide whether to add a single streamtrace or a rake of streamtraces.
NUMPTS	= <integer>	1	Use 1 to add a single streamtrace. Use *n*, *n*>1 for a rake of streamtraces.
STARTPOS			Z is necessary only if dealing with a 3D streamtrace.
{			
X	= <dexp>	0.0	
Y	= <dexp>	0.0	
Z	= <dexp>	0.0	
}			
STREAMTYPE	=<streamtype>		Tecplot 360 determines the default STREAMTYPE based on a number of factors. It is best to always specify this parameter explicitly.

Example 1:

Add a rake of 5 streamtraces in a 2D field plot:

```
$!STREAMTRACE ADD
NUMPTS      = 5
STREAMTYPE = TWODLINE
STARTPOS
{
 X = 0.5
 Y = 0.5
}
ALTSTARTPOS
{
 X = 0.5
 Y = 1.5
}
```

Example 2:

Add a single volume ribbon. Start the ribbon oriented parallel to the Z-axis:

```
$!STREAMTRACE ADD
STREAMTYPE = VOLUMERIBBON
STARTPOS
{
 X = 3.0
 Y = 4.0
 Z = 1.0
}
ALTSTARTPOS
{
```

```
 X = 3.0
 Y = 4.0
 Z = 8.0
}
```

$!STREAMTRACE DELETEALL

Syntax: `$!STREAMTRACE DELETEALL`
`[no parameters]`

Description: Deletes all streamtraces in the active frame. If the frame mode is 2D, all 2D streamtraces are deleted. If the frame mode is 3D, all 3D streamtraces are deleted.

Example:

```
$!STREAMTRACE DELETEALL
```

$!STREAMTRACE DELETERANGE

Syntax: `$!STREAMTRACE DELETERANGE`
`[optional parameters]`

Description: Delete a range of streamtraces. Streamtraces are numbered sequentially in the order they were created.

Optional Parameters

Parameters	Syntax	Default	Notes
RANGESTART	= <integer>	1	
RANGEEND	= <integer>	1	

Example: Delete streamtraces 3-5:

```
$!STREAMTRACE DELETERANGE
RANGESTART = 3
RANGEEND    = 5
```

$!STREAMTRACE RESETDELTATIME

Syntax: `$!STREAMTRACE RESETDELTATIME`
`[no parameters]`

Description: Reset the time delta for dashed streamtraces. The delta time is reset such that a stream dash in the vicinity of the maximum vector magnitude will have a length approximately equal to 10 percent of the frame width.

Example:

```
$!STREAMTRACE RESETDELTATIME
```

$!STREAMTRACE SETTERMINATIONLINE

Syntax: `$!STREAMTRACE SETTERMINATIONLINE`
<xyrawdata>

Description: Set the position of the termination line for streamtraces.

Required Parameter

Parameters	Syntax	Default	Notes
<xyrawdata>			In 3D, the termination line is defined in the eye coordinate system.

Example: Set the termination line using 3 points:

```
$!STREAMTRACE SETTERMINATIONLINE
RAWDATA
3
4  0  7  0
5  0  9  0
5  0  3  0
```

$!STREAMTRACELAYERS

Syntax: `$!STREAMTRACELAYERSSHOW = <boolean>`

Description: Turn streamtraces on or off.

Required Parameters

Parameter	Syntax	Default	Notes
SHOW	= <boolean>	NO	
SHOWPATHS	= <boolean>	YES	
SHOWDASHES	= <boolean>	YES	
SHOWARROWHEADS	= <boolean>	YES	
SHOWMESH	= <boolean>	YES	
SHOWCONTOUR	= <boolean>	YES	
SHOWSHADE	= <boolean>	YES	
SHOWMARKERS	= <boolean>	YES	
USETRANSLUCENCY	= <boolean>	YES	
USELIGHTINGEFFECT	= <boolean>	YES	

$!SYSTEM

Syntax: `$!SYSTEM` <string>
`[optional parameters]`

Description: Instruct Tecplot 360 to submit a command to the operating system. For security reasons, execution of the `$!SYSTEM` command can be disabled to prevent unauthorized execution of system commands via macros. Use the `OKTOEXECUTESYSTEMCOMMAND` option to the `$!INTERFACE` macro command.

Example: Submit the system command to copy the file t7.plt to xxx.plt (UNIX):

```
$!SYSTEM "cp t7.plt xxx.plt"
```

Example: Submit the system command to copy the file t7.plt to xxx.plt (WINDOWS):

```
$!SYSTEM "cmd /c t7.plt xxx.plt"
```

Optional Parameters

Parameter	Syntax	Default	Notes
WAIT	= <boolean>	YES	If YES, Tecplot 360 will wait until the execution of the system command has completed before continuing.

T

$!THREEDAXIS

Syntax: `$!THREEDAXIS`
`[optional parameters]`

Description: A SetValue command that assigns attributes for axes in a 3D frame.

Optional Parameters

Parameter	Syntax	Default	Notes
ASPECTRATIOLIMIT	<op> <dexp>	= 25	Restrict the aspect ratio of the data.
ASPECTRATIORESET	<op> <dexp>	= 2	Set aspect ratio for the data to this value when ASPECTRATIOLIMIT is exceeded.
AXISMODE	= <axismode>		Set to INDEPENDENT, XYDEPENDENT, or XYZDEPENDENT.
BOXASPECTRATIOLIMIT	<op> <dexp>	= 25	Restrict the aspect ratio of the axis box.
BOXASPECTRATIORESET	<op> <dexp>	= 2	Set aspect ratio for the axis box to this value when ASPECTRATIOLIMIT is exceeded.
DEPXTOYRATIO	<op> <dexp>		AXISMODE must be DEPENDENT to use this.
DEPXTOZRATIO	<op> <dexp>		AXISMODE must be DEPENDENT to use this.
EDGEAUTORESET	= <boolean>		Make Tecplot 360 automatically choose edges to label.
FRAMEAXIS			
{			
SHOW	= <boolean>		
SIZE	<op> <dexp>		
LINETHICKNESS	<op> <dexp>		
COLOR	= <color>		
XYPOS	<<xy>>		
}			
GRIDAREA	<<gridarea>>		
PRESERVEAXISSCALE WHENRANGEISCHANGED	= <boolean>		
XDETAIL	<<axisdetail>>		
XYDEPXTOYRATIO	<op> <dexp>		AXISMODE must be XYDEPENDENT to use this.
YDETAIL	<<axisdetail>>		
ZDETAIL	<<axisdetail>>		

Example:

This example does the following:

- Changes the variable assigned to the Z-axis to be variable number 2.
- Turns off auto edge assignment and make axis labeling for the Y-axis occur on edge 2.

```
$!THREEDAXIS
ZVAR = 2
EDGEAUTORESET = NO
YEDGE = 2
```

$!THREEDVIEW

Syntax: `$!THREEDVIEW`
`[optional parameters]`

Description: A SetValue command that changes global attributes associated with the 3D view.

Optional Parameters

Parameter	Syntax	Default	Notes
ALPHAANGLE	<op> <dexp>	= 0	Angle is in degrees.
DRAWINPERSPECTIVE	= <boolean>	NO	
FIELDOFVIEW	<op> <dexp>		
PSIANGLE	<op> <dexp>	= 60	Angle is in degrees.
THETAANGLE	<op> <dexp>	= 240	Angle is in degrees.
VIEWERPOSITION	<<xyz>>	See Notes	X = 8.073, Y = 4.873, Z = 5.549
VIEWWIDTH	<op> <dexp>	= 1.74267	

Example:

This example does the following:

- Switches to perspective.
- Changes the field of view.
- Rotates around psi by 20 degrees.
- Changes the viewer position.

```
$!THREEDVIEW
DRAWNINPERSPECTIVE = YES
FIELDOFVIEW = 100
PSIANGLE += 20
VIEWERPOSITION
{
 X = 1.26
 Y = 1.25
 Z = 0.74
 }
```

$!TRANSFORMCOORDINATES

Syntax:
```
$!TRANSFORMCOORDINATES
TRANSFORMATION = <transformation>
[optional parameters]
```

Description: Transforms all points in one or more zones from one coordinate system to another.

Tecplot 360 versions 2006 R2 and earlier incorrectly recorded the $!TRANSFORMCOORDINATES command. In these versions, the variable number options in this command were recorded as zero-based values instead of one-based values. Macros or layout files created with any of these versions and containing $!TRANSFORMCOORDINATES should increment each variable sub-command option by “one” in order to operate correctly with Tecplot 360 versions 2008 and newer.

Required Parameter

Parameters	Syntax	Default	Notes
TRANSFORMATION	= <transformation>		Transformation.

Optional Parameters

Parameter	Syntax	Default	Notes
ANGLESPEC	= <anglespec>	RADIANS	Specifies whether data is in degrees or radians
CREATENEW VARIABLES	= <boolean>	NO	If YES, then new variables X,Y,Z will be created if converting to rectangular coordinates, or R,THETA,PHI if converting to spherical. If NO, then you must specify the output variables.
PSIVAR	= <integer>		PSI variable number. REQUIRED if the transformation is spherical to rectangular or if CREATENEWVARIABLES is NO.
RVAR	= <integer>		R variable number. REQUIRED if the transformation is polar to rectangular or spherical to rectangular or if CREATENEWVARIABLES is NO.
THETAVAR	= <integer>	NONE	Theta variable number. REQUIRED if the transformation is polar to rectangular or spherical to rectangular or if CREATENEWVARIABLES is NO.
XVAR	= <integer>		X variable number. REQUIRED if the transformation is rectangular to polar or rectangular to spherical or CREATENEWVARIABLES is NO.
YVAR	= <integer>		Y variable number. REQUIRED if the transformation is rectangular to polar or rectangular to spherical or CREATENEWVARIABLES is NO.
ZONELIST	= <set>	all zones	Set of zones to operate on.
ZVAR	= <integer>		Z variable number. REQUIRED if the transformation or rectangular to spherical or CREATENEWVARIABLES is NO.

Example:

Transform data from rectangular coordinates to polar coordinates specifying angles in degrees and creating new variables.

```
$!TRANSFORMCOORDINATES
 TRANSFORMATION = RECTTOPOLAR
 ANGLESPEC = DEGREES
 CREATENEWVARIABLES = YES
 XVAR = 2
 YVAR = 3
```

$!TRIANGULATE

Syntax: `$!TRIANGULATE`
`[optional parameters]`

Description: Create a new zone by forming triangles from data points in existing zones.

Optional Parameters:

Parameters	Syntax	Default	Notes
AUTOSTRANDTRANSIENTDATA	= <boolean>	YES	If set to YES, time strands are automatically created for transient data in the new zone.
BOUNDARYZONES	= <set>		Required if USEBOUNDARY is YES.
INCLUDEBOUNDARY PTS	= <boolean>	NO	Set to YES if you also want the boundary points to be used to create triangles.
SOURCEZONES	= <set>	All zones.	
TRIANGLEKEEP FACTOR	= <dexp>	0.25	
USEBOUNDARY	= <boolean>	NO	Specify one or more I-ordered zones that define boundaries across which no triangles can be created.

Example: Create a zone by triangulating data points from zones 1 and 2:

```
$!TRIANGULATE
SOURCEZONES= [1,2]
```

$!TWODAXIS

Syntax: `$!TWODAXIS`
`[optional parameters]`

Description: A SetValue command that assigns attributes for axes in a 2D frame.

Optional Parameters

Parameter	Syntax	Default	Notes
AUTOADJUSTRANGES TONICEVALUES	= <boolean>		
AXISMODE	<axismode>		Set to INDEPENDENT or XYDEPENDENT
DEPXTOYRATIO	<op> <dexp>		AXISMODE must be XYDEPENDENT to use this.
GRIDAREA	<<gridarea>>		
PRECISEGRID	<<precisegrid>>		
PRESERVEAXISSCALE WHENRANGEISCHANGED	= <boolean>		
VIEWPORTNICEFIT BUFFER	= <double>		
VIEWPORTPOSTITION	<<rect>>		
VIEWPORTTOPSNAP TARGET	= <integer>	100	
VIEWPORTTOPSNAP TOLERANCE	= <integer>	10	
XDETAIL	<<axisdetail>>	VARNUM = 1	
YDETAIL	<<axisdetail>>	VARNUM = 2	

Example: Set the X-axis to use variable 3 for a 2D plot:

```
$!TWODAXIS
XDETAIL {VARNUM = 3}
```

V

$!VARSET

Syntax: $!VARSET <macrovar> <op> <dexp>
[no parameters]
or
$!VARSET <macrovar> = <string>
[no parameters]

Description: Assign a value to a macro variable. If the macro variable did not exist prior to this command, then it is defined here. A macro variable can be assigned a value or a string.

Examples:

Example 1:

Set the macro variable |myvar| to 3:

```
$!VARSET |myvar| = 3
```

Example 2:

Add 2 to the macro variable |myvar|:

```
$!VARSET |myvar| += 2
```

Example 3:

Set the macro variable |File1| to be myfile.plt:

```
$!VARSET |File1| = "myfile.plt"
```

Example 4:

Set the macro variable |F1| to equal |V2| + |V3|, where |V2| and |V3| are predefined variables:

```
$!VARSET|V2| = 4
$!VARSET|V3| = 5
$!VARSET|F1| = (|V2| + |V3|)
```

$!VIEW *[Required-Control Option]*

Description: The different commands in the VIEW compound function family are described separately in the following sections.

The VIEW compound function family is:

```
$!VIEW AXISFIT
$!VIEW AXISMAKECURRENTVALUESNICE
$!VIEW AXISNICEFIT
$!VIEW CENTER
$!VIEW COPY
$!VIEW DATAFIT
$!VIEW FIT
```

```
$!VIEW FITSURFACES
$!VIEW LAST
$!VIEW MAKECURRENTVIEWNICE
$!VIEW NICEFIT
$!VIEW PASTE
$!VIEW PUSH
$!VIEW RESETTOENTIRECIRCLE
$!VIEW SETMAGNIFICATION
$!VIEW TRANSLATE
$!VIEW ZOOM
```

$!VIEW AXISFIT

Syntax: `$!VIEW AXISFIT`
`[optional parameters]`

Description: Reset the range on a specific axis so that it equals the minimum and maximum of the data being plotted. If the axis dependency is not independent then this action may also affect the range on another axis.

Optional Parameters

Parameter	Syntax	Default	Notes
AXIS	= <xyaxis>	'X'	Default is 'T' for polar plot type.
AXISNUM	= <integer>	1	Only XY frame mode allows for this to be a number greater than 1.

Example: Reset the range on the Y-axis to fit the data being plotted:

```
$!VIEW AXISFIT
AXIS ='Y'
```

$!VIEW AXISMAKECURRENTAXISVALUESNICE

Syntax: `$!VIEW AXISMAKECURRENTAXISVALUESNICE`
`[optional parameters]`

Description: Reset the axis-line label values such that all currently displayed values are set to have the smallest number of significant digits possible.

Optional Parameters

Parameter	Syntax	Default	Notes
AXIS	= <xyaxis>	'X'	Default is 'T' for polar plot type.
AXISNUM	= <integer>	1	Only XY line plots allow for this to be a number greater than 1.

Example: Set the range on the Z-axis to have nice values for the axis labels:

```
$!VIEW AXISMAKECURRENTAXISVALUESNICE
AXIS = 'Z'
```

$!VIEW AXISNICEFIT

Syntax: `$!VIEW AXISNICEFIT`
`[optional parameters]`

Description: Reset the range on a specific axis so that it equals the minimum and maximum of the data being plotted, but makes the axis values "nice" by setting labels to have the smallest number of significant digits possible. If the axis dependency is not independent then this action may also affect the range on another axis.

Optional Parameters:

Parameter	Syntax	Default	Notes
AXIS	= <xyaxis>	'X'	Default is 'T' for polar plot type.
AXISNUM	= <integer>	1	Only XY frame mode allows for this to be a number greater than 1.

Example:

Reset the range on the Y-axis to fit the data being plotted, with nice values on the axis-line:

```
$!VIEW AXISNICEFIT
AXIS ='Y'
```

$!VIEW CENTER

Syntax: `$!VIEW CENTER`
`[no parameters]`

Description: Center the data within the axis grid area.

$!VIEW COPY

Syntax: `$!VIEW COPY`
`[no parameters]`

Description: Copy the current view to the view paste buffer. See also `$!VIEW PASTE`.

$!VIEW DATAFIT

Syntax: `$!VIEW DATAFIT`
`[no parameters]`

Description: Fit the current set of data zones or line mappings being plotted within the grid area. This does not take into consideration text or geometries.

$!VIEW FIT

Syntax: `$!VIEW FIT`
`[no parameters]`

Description: Fit the entire plot to the grid area. This also takes into consideration text and geometries that are plotted using the grid coordinate system. In 3D, this also includes the axes.

$!VIEW FITSURFACES

Syntax: `$!VIEW FITSURFACES`
`[no parameters]`

Description: Fits active plot surfaces to the grid area. 3D volume zones are excluded when surfaces to plot are set to none. See $!FIELDMAP for more information on setting surfaces to plot.

$!VIEW LAST

Syntax: `$!VIEW LAST`
`[no parameters]`

Description: Retrieve the previous view from the view stack. Each frame mode within each frame maintains its own view stack. `$!VIEW LAST` will not reverse alterations to data.

$!VIEW MAKECURRENTVIEWNICE

Syntax: `$!VIEW MAKECURRENTVIEWNICE`
`[no parameters]`

Description: Shifts axis to make axis-line values nice without changing the extents of the window. Only works in Sketch/XY/2D.

$!VIEW NICEFIT

Syntax: `$!VIEW NICEFIT`
`[no parameters]`

Description: Change view to make the extents of the frame neatly hold the plot with integer values for axis labels. Only works in Sketch/XY/2D.

$!VIEW PASTE

Syntax: `$!VIEW PASTE`
`[no parameters]`

Description: Retrieve the view from the view paste buffer and assign it to the active frame.

$!VIEW PUSH

Syntax: `$!VIEW PUSH`
`[no parameters]`

Description: Instruct Tecplot 360 to push the current view onto the view stack. A view will not be pushed if the current view is the same as the top view on the stack. Note that commands `VIEW AXISFIT`, `VIEW CENTER`, `VIEW DATAFIT`, `VIEW FIT`, and `VIEW ZOOM` automatically push a view onto the stack. Tecplot 360 automatically pushes the current view onto the stack when a `$!REDRAW` command is issued and the current view is different from the top view on the view stack.

$!VIEW RESETTOENTIRECIRCLE

Syntax: `$!VIEW RESETTOENTIRECIRCLE`
`[no parameters]`

Description: Reset the Theta-R Axis to initial settings. For Polar plots only.

$!VIEW SETMAGNIFICATION

Syntax: `$!VIEW SETMAGNIFICATION`
`MAGNIFICATION = <dexp>`

Description: Set the magnification for the data being plotted. A magnification of 1 will size the plot so it can fit within the grid area.

Required Parameter

Parameter	Syntax	Default	Notes
MAGNIFICATION	= <dexp>		

Example: Make the plot to be drawn one-half as big as when it fits within the grid area:

```
$!VIEW SETMAGNIFICATION
MAGNIFICATION = 0.5
```

$!VIEW TRANSLATE

Syntax: `$!VIEW TRANSLATE`
`X = <dexp>`
`Y = <dexp>`
`[no optional parameters]`

Description: Shift the data being plotted in the X- and/or Y-direction. The amount translated is in frame units.

Required Parameters

Parameter	Syntax	Default	Notes
X	= <dexp>	0.0	Amount to translate in X-frame units.
Y	= <dexp>	0.0	Amount to translate in Y-frame units.

Example: Translate the view 10 percent of the frame width to the right:

```
$!VIEW TRANSLATE
 X = 10
 Y = 0
```

$!VIEW ZOOM

Syntax: `$!VIEW ZOOM`
`X1 = <dexp>`
`Y1 = <dexp>`
`X2 = <dexp>`
`Y2 = <dexp>`
`[no optional parameters]`

Description: Change the view by "zooming" into the data. In Sketch, XY, and 2D frame mode plots, Tecplot 360 will adjust the ranges on the axis to view the region defined by the rectangle with corners at (X1, Y1) and (X2, Y2). For 3D orthographic plots, the view is translated and scaled to fit the region. For 3D perspective plots, the view is rotated about the viewer and scaled to fit the region. X1 and so forth are measured in grid coordinates.

Required Parameters

Parameter	Syntax	Default	Notes
X1	= <dexp>		
Y1	= <dexp>		
X2	= <dexp>		
Y2	= <dexp>		

Example: Zoom so the rectangular region with corners at (1, 0) and (7, 9) are in view:

```
$!VIEW ZOOM
X1 = 1
Y1 = 0
X2 = 7
Y2 = 9
```

W - X

$!WHILE...$!ENDWHILE

Syntax: `$!WHILE` <conditionalexp>
`.$!ENDWHILE`

Description: Continue to execute a set of commands until a conditional expression is NO.

Example: Execute a set of commands until the macro variable `|myvar|` is greater than 1.0:

```
$!VARSET |myvar| = 0.0
$!WHILE |myvar| < 1.0
$!VARSET |myvar| += 0.01
$!ENDWHILE
```

$!WORKSPACEVIEW *[Required-Control Option]*

Description: The different commands in the `WORKSPACEVIEW` compound function family are described separately in the following sections.

The `WORKSPACEVIEW` compound functions are:

```
$!WORKSPACEVIEW FITALLFRAMES
$!WORKSPACEVIEW FITPAPER
$!WORKSPACEVIEW FITSELECTEDFRAMES
$!WORKSPACEVIEW LASTVIEW
$!WORKSPACEVIEW MAXIMIZE
$!WORKSPACEVIEW TRANSLATE
$!WORKSPACEVIEW UNMAXIMIZE
$!WORKSPACEVIEW ZOOM
```

$!WORKSPACEVIEW FITALLFRAMES

Syntax: `$!WORKSPACEVIEW FITALLFRAMES`
`[no parameters]`

Description: Change the view in the workspace so all frames are fit just inside the edges of the workspace.

$!WORKSPACEVIEW FITPAPER

Syntax: `$!WORKSPACEVIEW FITPAPER`
`[no parameters]`

Description: Change the view in the workspace so the entire paper is fit just inside the edges of the workspace.

$!WORKSPACEVIEW FITSELECTEDFRAMES

Syntax: `$!WORKSPACEVIEW FITSELECTEDFRAMES`
`[no parameters]`

Description: Change the view in the workspace so the currently selected frames (that is, the frames with pick handles) are fit just inside the edges of the workspace.

$!WORKSPACEVIEW LASTVIEW

Syntax: `$!WORKSPACEVIEW LASTVIEW`
`[no parameters]`

Description: Return to the previous workspace view.

$!WORKSPACEVIEW MAXIMIZE

Syntax: `$!WORKSPACEVIEW MAXIMIZE`
`[no parameters]`

Description: Temporarily expand the work area as large as possible. The maximized work area occupies the entire Tecplot 360 process window.

$!WORKSPACEVIEW TRANSLATE

Syntax: `$!WORKSPACEVIEW TRANSLATE`
`X = <dexp>`
`Y = <dexp>`
`[no optional parameters]`

Description: Shift the view of the workspace. This has no effect on the local view within any frame in your layout.

Required Parameters

Parameter	Syntax	Default	Notes
X	= <dexp>	0	Value is in inches.
Y	= <dexp>	0	Value is in inches.

Example:

Shift the workspace view to the left by 2 inches (as measured by the workspace ruler):

```
$!WORKSPACEVIEW TRANSLATE
X = -2
Y = 0
```

$!WORKSPACEVIEW UNMAXIMIZE

Syntax: `$!WORKSPACEVIEW UNMAXIMIZE`
`[no parameters]`

Description: Returns the workspace to its normal size after it has been expanded after `$!WORKSPACE MAXIMIZE` has been used.

$!WORKSPACEVIEW ZOOM

Syntax: `$!WORKSPACEVIEW ZOOM`
`X1 = <dexp>`
`Y1 = <dexp>`
`X2 = <dexp>`
`Y2 = <dexp>`
`[no optional parameters]`

Description: Change the view into the work area. This has no effect on the local view within any frame in your layout.

Required Parameters

Parameter	Syntax	Default	Notes
X1	= <dexp>		
Y1	= <dexp>		
X2	= <dexp>		
Y2	= <dexp>		

Example:

Make the region in the lower left corner of an 8.5 by 11 paper be viewable in the work area. The paper is in portrait orientation:

```
$!WORKSPACEVIEW ZOOM
X1 = 0
Y1 = 5.5
X2 = 4.25
Y2 = 9.75
```

$!WRITECOLORMAP

Syntax: `$!WRITECOLORMAP` <string>
`[no parameters]`

Description: Write the current color map to a file. The <string> is the name of the file to write to.

Example:

```
$!WRITECOLORMAP "mycolors.map"
```

$!WRITECURVEINFO

Syntax: `$!WRITECURVEINFO` <string>
`SOURCEMAP =` <integer>
`[optional parameters]`

Description: Write out the curve details or the calculated data points for the equation(s) used to draw the curve for a selected line mapping. The <string> is the name of the file to write to.

Required Parameter

Parameter	Syntax	Default	Notes
SOURCEMAP	= <integer>		This must be the number of a line mapping that does some type of curve fit or spline.

Optional Parameter

Parameters	Syntax	Default	Notes
CURVEINFOMODE	= <curveinfomode>	CURVE DETAILS	Use CURVE DETAILS or CURVEPOINTS.

Example: Write out the coefficients for XY line mapping number 3 to `map3.out`:

```
$!WRITECURVEINFO "map3.out"
SOURCEMAP      = 3
CURVEINFOMODE  = CURVE DETAILS
```

$!WRITEDATASET

Syntax: `$!WRITEDATASET` <string>
`[optional parameters]`

Description: Write the data set attached to the active frame to a file. The <string> is the name of the file to write to.

Optional Parameters

Parameters	Syntax	Default	Notes
ASSOCIATELAYOUTWITHDATAFILE	= <boolean>	YES	
BINARY	= <boolean>	YES	If NO, you can include PRECISION and USEPOINTFORMAT.
INCLUDEAUTOGENFACENEIGHBORS	= <boolean>	NO	
INCLUDECUSTOMLABELS	= <boolean>	YES	
INCLUDEDATA	= <boolean>	YES	
INCLUDEDATASHARELINKAGE	= <boolean>	NO	
INCLUDEGEOM	= <boolean>	YES	
INCLUDETEXT	= <boolean>	YES	
PRECISION	= <integer>	12	Only used if ASCII (that is, BINARY is NO).
TECPLOTVERSIONTOWRITE	= <string>	TecplotCurrent	Optional designation of binary file version. Possible values are TecplotCurrent, Tecplot2009, Tecplot2008, and Tecplot2006.
USEPOINTFORMAT	= <boolean>	NO	Only used if ASCII (that is, BINARY is NO).
VARPOSITIONLIST	= <set>	All vars.	Use this to limit the number of variables written out.
ZONELIST	= <set>	All zones.	Use this to limit the number of zones written out.

Example: Write out only zone 3 to a file called `zone3.plt`:

```
$!WRITEDATASET "zone3.plt"
INCLUDETEXT         = NO
INCLUDEGEOM         = NO
INCLUDECUSTOMLABELS = NO
ZONELIST            = [3]
```

$!WRITESTYLESHEET

Syntax: `$!WRITESTYLESHEET` <string>
`[optional parameters]`

Description: Write the style for the active frame to a file. The <string> is the name of the file to write to.

Optional Parameters

Parameters	Syntax	Default	Notes
INCLUDECONTOURLEVELS	= <boolean>	YES	
INCLUDETEXT	= <boolean>	YES	
INCLUDEGEOM	= <boolean>	YES	
INCLUDEPLOTSTYLE	= <boolean>	YES	
INCLUDESTREAMPOSITIONS	= <boolean>	YES	
INCLUDEFACTORYDEFAULTS	= <boolean>	NO	
USERELATIVEPATHS	= <boolean>		
INCLUDEAUXDATA	= <boolean>	YES	

Example: Write out a stylesheet for the active frame to `f1.sty`:

```
$!WRITESTYLESHEET "f1.sty"
INCLUDEFACTORYDEFAULTS = YES
```

$!XYLINEAXIS

Syntax: `$!XYLINEAXIS`
`[optional parameters]`

Description: A SetValue command that assigns attributes for axes in an XY Line plot.

Optional Parameters

Parameter	Syntax	Default	Notes
AUTOADJUSTRANGESTONICEVALUES	= <boolean>	NO	
AXISMODE	<axismode>	INDEPENDENT	Set to INDEPENDENT or XYDEPENDENT.
DEPXTOYRATIO	<op> <dexp>	= 1	AXISMODE must be XYDEPENDENT to use this. This applies only to the X1- and Y1-axes.
GRIDAREA	<<gridarea>>	See Notes	DRAWBORDER=N0, COLOR=BLACK, LINE THICKNESS=0.4
PRECISEGRID	<<precisegrid>>	See Notes	INCLUDE=NO, SIZE=0.0045, COLOR=BLACK, ISFILLED=NO, FILLCOLOR=WHITE, DRAWGRIDLAST=NO
PRESERVEAXISSCALE	= <boolean>	NO	
VIEWPORTNICEFITBUFFER	= <double>		Between 1 and 100.
VIEWPORTPOSITION		See Notes	X1 = 13, Y1 = 11, X2 = 8, Y = 88
VIEWPORTTOPSNAPTARGET	= <integer>	100	
VIEWPORTTOPSNAPTOLERANCE	= <integer>	10	
XDETAIL	<integer> <<axisdetail>>		The <integer> option specifies which axis to operate on, 1 ≤ n ≤ 5.
YDETAIL	<integer> <<axisdetail>>		The <integer> option specifies which axis to operate on, 1 ≤ n ≤ 5.

Example: Set the axis mode to be independent for the XY-axes (note that this affects only X1 versus Y1):

```
$!XYLINEAXIS
AXISMODE = INDEPENDENT
```

10

Macro Commands for the Analyze Menu

All of the macro commands associated with the **Analyze** menu are embedded within Tecplot 360's EXTENDEDCOMMAND macro. The syntax of this macro is shown below:

```
$!EXTENDEDCOMMAND
  COMMANDPROCESSORID = <string>
  COMMAND = <string>
```

The first <string> is a text string should be set to CFDAnalyzer3. The second string is sent to one of the add-ons listed below.

10 - 1 Summary of Analyze Macro Commands

ANIMATESTREAKLINES may be used following a streakline calculation to animate the streaklines, either to the screen or to a file.

ATTACHINTEGRATIONRESULTS is used following an integration to create a text field and attach it to the current Tecplot 360 frame. This macro has the same effect as clicking Make Text on the Integration Results text dialog.

Note: It is not necessary to direct the macro to display the Integration Results dialog in order to attach or save the results.

CALCPARTICLEPATH calculates particle paths or streaklines for steady or unsteady flow solutions, using the location of any existing streamtraces as starting locations for the particles. Particles may have mass or be massless.

CALCTURBULENCEFUNCTION calculates any of four turbulence-related functions, given any two in your data set.

CALCULATE calculates a PLOT3D function. The name of this function must be specified in the shortened form listed in Section 10 - 3 "Parameter Assignment Values".

CALCULATEACCURACY uses Richardson extrapolation to estimate the order accuracy of the solution, given the solution on three grids of successively finer resolution. If either of the plotting options are set to TRUE, the resulting Tecplot 360 frames will be in front after executing this command.

DISPLAYBOUNDARIES displays zone boundaries in a new frame according to settings made by the SETGEOMETRYANDBOUNDARIES macro. Each boundary of each 3D zone (in 3D Cartesian plots) or 2D zone (in 2D Cartesian plots) is displayed and named according to the boundary condition applied to it. Boundaries that are connected to the boundaries of adjacent zones are named as such.

EXTRACTFLOWFEATURE displays shock surfaces, vortex cores, or separation and attachment lines for 3D flow solutions. Separation and attachment lines are only calculated on no-slip wall boundaries identified by the SETGEOMETRYANDBOUNDARIES macro. Shock surfaces are displayed as iso-surfaces of a new variable, ShockFeature, while the remaining features are displayed as new zones.

EXTRAPOLATESOLUTION performs Richardson extrapolation to estimate the true solution from three input solutions on grids of successively finer resolution. It saves the extrapolated solution as a new zone in the current data set. It also saves an additional zone containing the difference between this solution and the original solution.

INTEGRATE performs an integration. All Integrate dialog options are available to this macro, including the display options. If the PLOTRESULTS parameter is set to TRUE, then the Tecplot 360 frame showing the integration results is the active frame following this command.

SAVEINTEGRATIONRESULTS has the same effect as clicking Save on the Integration Results dialog and selecting a file. The results are saved to the file named by the FILE parameter.

SETFIELDVARIABLES identifies variables in your data, such as velocity, pressure and temperature, for use in analysis.

SETFLUIDPROPERTIES sets the properties of the fluid, such as viscosity. These are used by some actions of the CALCULATE and INTEGRATE commands.

SETGEOMETRYANDBOUNDARIES identifies boundaries of zones in a flow solution and the boundary conditions applied to them. It also specifies whether zones with coincident boundary nodes should be considered connected at those points, as well as whether 2D solutions should be regarded as axisymmetric.

SETREFERENCEVALUES sets the reference (free-stream) properties of the solution. This information is used by other calculations.

SETUNSTEADYFLOWOPTIONS identifies solution time levels for unsteady flow solutions. This information is used for particle path and streakline calculations.

10 - 2 Macro Command Description

The syntax, mandatory and optional parameters for each of the macro commands listed in Section 10 - 1 are described below. Items within single angle brackets (<>) are defined in Section 10 - 3.

The COMMAND strings below must be contained on a single line in your macro command file, although they appear on multiple lines below.

ANIMATESTREAKLINES

Syntax: $!EXTENDEDCOMMAND

```
COMMANDPROCESSORID = 'CFDANALYZER3'
COMMAND = 'ANIMATESTREAKLINES
```

```
   [optional parameters]'
```

Description: Animates previously calculated streaklines to the screen or to a file.

Optional Parameters:

Parameter	Syntax	Default	Notes
DESTINATION	= <string>	SCREEN	Specifies the destination of the animation. May be SCREEN, AVIFILE or RASTERMETAFILE.
FILENAME	= <string>	""	The name of the file to which to save the animation. Must be specified for DESTINATION values of AVIFILE or RASTERMETAFILE.
WIDTH	= <integer>	300	The width of the animation when saved to a file.
SPEED	= <double>	10.0	The speed in frames per second of the animation. Only used for animations saved to an AVI file.
USEMULTIPLECOLOR TABLES	= <boolean>	FALSE	Specifies whether animations saved to a file should include one color table for each frame. The default is to use a single color table.
INCLUDEZONE ANIMATION	= <boolean>	FALSE	

ATTACHINTEGRATIONRESULTS

Syntax:
```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = 'CFDAnalyzer3'
COMMAND = 'ATTACHINTEGRATIONRESULTS'
```

Description: Attach the text results of the previous integration as a text field in the active frame.

CALCPARTICLEPATH

Syntax:
```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = 'CFDAnalyzer3'
COMMAND = 'CALCPARTICLEPATH
   [optional parameters]'
```

Description: Calculate particle paths or streaklines, starting from existing Tecplot 360 streamtraces.

Optional Parameters:

Parameter	Syntax	Default	Notes
FUNCTION	= <particlefunction>	PARTICLEPATH	Can be PARTICLEPATH or STREAKLINE.
TIMESTEP	= <double>	1	The integration time step for the calculation.
MAXTIMESTEPS	= <integer>	1000	For steady-state calculations only.
RELEASEFREQ	= <double>	1	For FUNCTION = STREAKLINE. Indicates the number of particles to release in the indicated time period (see the next parameter).
RELEASEOPTION	= <releaseoption>	TIMELEVEL	For FUNCTION = STREAKLINE. If TIMELEVEL, indicates that RELEASEFREQ particles should be released every solution time level. If UNITTIME, indicates that this number of particles should be released in a unit amount of solution time.
HAVEMASS	= <boolean>	FALSE	If TRUE, particles have mass; specify the particle mass options below.
CREATESINGLEZONE	= <boolean>	FALSE	For FUNCTION = PARTICLEPATH only, specifies that all particle paths should be combined into a single I-J ordered zone.
STOREOPTION	= <storeoption>	PARTICLEVALUES	If PARTICLEVALUES, the particle's velocity, mass and temperature (if calculated) will be stored in place of appropriate fluid values in the particle path's zone. If FLUIDVALUES, all fluid values the particle passed through will be stored in the zone.
COEFFS	= <coeffsoption>	GENERAL	If GENERAL, specify BALLISTICCOEFF, plus TEMPTIMECONST if calculating particle temperature. If DETAILED, specify MASS, RADIUS, and DRAGCOEFF, plus SPECIFICHEAT and NUSSELT if calculating temperature. Only applies if HAVEMASS = TRUE.
CALCTEMPERATURE	= <boolean>	FALSE	If TRUE, particle temperature will be calculated. Only applies if HAVEMASS = TRUE.
GRAVITYCONSTANT	= <double>	0.0	The acceleration due to gravity. Only applies if HAVEMASS = TRUE.
GRAVITYDIRECTION	= <gravitydirection>	MINUSX	The axis direction in which gravity acts. Only applies if HAVEMASS = TRUE.
INITIALVELOCITYOPTION	= *<initialvelocityoption>*	LOCALFLUIDVELOCITY	The initial velocity of particles. Options are LOCALFLUIDVELOCITY and ZEROVELOCITY. Only applies if HAVEMASS = TRUE.
BALLISTICCOEFF	= <double>	1.0	For GENERAL coefficients only, the ballistic coefficient of the particle. Only applies if HAVEMASS = TRUE.
TEMPTIMECONST	= <double>	1.0	For GENERAL coefficients with CALCTEMPERATURE = TRUE only, the temperature relaxation factor of the particle. Only applies if HAVEMASS = TRUE.
MASS	= <double>	1.0	For DETAILED coefficients only, the particle mass. Only applies if HAVEMASS = TRUE.
RADIUS	= <double>	1.0	For DETAILED coefficients only, the particle initial radius. Only applies if HAVEMASS = TRUE.

Parameter	Syntax	Default	Notes
DRAGCOEFFOPTION	= <specifyoption>	SPECIFY	For DETAILED coefficients only. If SPECIFY, specify DRAGCOEFF. If CALCULATE, Tecplot 360 will calculate the drag coefficient. Only applies if HAVEMASS = TRUE.
DRAGCOEFF	= <double>	1.0	For DETAILED coefficients only, with DRAGCOEFFOPTION = SPECIFY, the particle drag coefficient. Only applies if HAVEMASS = TRUE.
SPECIFICHEAT	= <double>	1.0	For DETAILED coefficients with CALCTEMPERATURE = TRUE only, the particle specific heat. Only applies if HAVEMASS = TRUE.
NUSSELTOPTION	= <specifyoption>	SPECIFY	For DETAILED coefficients with CALCTEMPERATURE = TRUE only. If SPECIFY, specify NUSSELT. If CALCULATE, Tecplot 360 will calculate the Nusselt number. Only applies if HAVEMASS = TRUE.
NUSSELT	= <double>	1.0	For DETAILED coefficients with CALCTEMPERATURE = TRUE and NUSSELTOPTION = SPECIFY only, the particle Nusselt number. Only applies if HAVEMASS = TRUE.
TERMOPTION	= <terminationoption>	TEMPERATURE	For DETAILED coefficients with CALCTEMPERATURE = TRUE only (is always TEMPERATURE for general coefficients), the particle termination option. May beTEMPERATURE or ABLATE. Only applies if HAVEMASS = TRUE.
TEMPERATURE	= <double>	1.0	If TERMOPTION = TEMPERATURE, the particle termination temperature. If TERMOPTION = ABLATE, the ablation temperature. Only applies if HAVEMASS = TRUE.
LATENTHEAT	= <double>	1.0	For TERMOPTION = ABLATE only, the latent heat of the ablative process. Only applies if HAVEMASS = TRUE.

Example 1: Calculate streaklines with an integration time step of 0.1, releasing eight particles per unit solution time:

```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = CFDAnalyzer3
COMMAND = 'CALCPARTICLEPATH
      FUNCTION=STREAKLINE
      TIMESTEP=0.1    RELEASEFREQ=8
      RELEASEOPTION=UNITTIME'
```

Example 2: Calculate particle paths, including temperature with ablation, in a steady-state flow for particles with an initial mass of 3E-14, an initial radius of 1.5E-6 and a specific heat of 703. Use a time step of 1E-6. Have Tecplot 360 calculate the drag coefficient and the Nusselt number. Use an ablation temperature of 2,250 and a latent heat of 1.5E5:

```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = CFDAnalyzer3
COMMAND = 'CALCPARTICLEPATH
      TIMESTEP = 1.0e-6
      HAVEMASS = TRUE
      COEFFS = DETAILED
      CALCTEMPERATURE = TRUE
      MASS = 3e-14
```

```
      RADIUS = 1.5e-6
      DRAGCOEFFOPTION = CALCULATE
      SPECIFICHEAT = 703
      NUSSELTOPTION = CALCULATE
      TERMOPTION = ABLATE
      TEMPERATURE = 2250
      LATENTHEAT = 1.5e5’
```

CALCTURBULENCEFUNCTION

Syntax:
```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = ‘CFDAnalyzer3’
COMMAND = ‘CALCTURBULENCEFUNCTION’
   [optional parameters]
```

Description: Calculate a turbulence-related function from two variables in the current data set. Add the result to the data set as a new variable using the function’s name, or overwrite the variable if it already exists.

Optional Parameters:

Parameter	Syntax	Default	Notes
CALCULATEONDEMAND	= <boolean>	FALSE	
FUNCTION	= <turbulencefunction>	FREQUENCY	May be ENERGY, DISSIPATIONRATE, FREQUENCY, or VISCOSITY.
ID1	= <turbulencefunction>	ENERGY	The turbulence quantity the first data set variable represents.
VARIABLE1	= <integer>	1	The number of the first data set variable.
ID2	= <turbulencefunction>	DISSIPATIONRATE	The turbulence quantity the second data set variable represents.
VARIABLE2	= <integer>	2	The number of the second data set variable.
VALUELOCATION	= *<valuelocation>*	NODAL	The location of new variables added to the data set. Can be NODAL or CELLCENTERED.

Example: Calculate turbulent kinematic viscosity from turbulent kinetic energy, variable 5, and turbulent frequency, variable 6:

```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = CFDAnalyzer3
COMMAND = ‘CALCTURBULENCEFUNCTION
      FUNCTION=VISCOSITY
      VARIABLE1=5
      ID2=FREQUENCY VARIABLE2=6’
```

CALCULATE

Syntax:
```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = ‘CFDAnalyzer3’
COMMAND = ‘CALCULATE FUNCTION = <functionname>
   [optional parameters]’
```

Description: Calculate a Tecplot 360 variable using the specified function and add it to the current data set. If the variable already exists in the current data set, it will be recalculated.

Required Parameter:

Parameter	Syntax	Default	Notes
FUNCTION	= <functionname>		Indicates the function to be used to calculate the variable. If it is a vector function, the components will be stored as X name, Y name, and Z name, where name is the function name appearing in the interface.

Optional Parameter:

Parameter	Syntax	Default	Notes
NORMALIZATION	= <normalizationoption>	NONE	May be NONE, MAXIMUMMAGNITUDE or REFERENCEVALUES.
VALUELOCATION	= *<valuelocation>*	NODAL	The location of new variables added to the data set. Can be NODAL or CELLCENTERED.
CALCULATEONDEMAND	= <boolean>	FALSE	

Example 1: Calculate the Jacobian for the grid of the current data set:

```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = CFDAnalyzer3
COMMAND = 'CALCULATE FUNCTION = JACOBIAN'
```

Example 2: Calculate the pressure coefficient for the current data set. The freestream density and speed of sound are 1.0 (the defaults):

```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = CFDAnalyzer3
COMMAND = 'CALCULATE
      FUNCTION = PRESSURECOEF'
```

CALCULATEACCURACY

Syntax:
```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = 'CFDAnalyzer3'
COMMAND = 'CALCULATEACCURACY ZONES = [<set>]
   [optional parameters]'
```

Description: Calculate the order accuracy of the solution contained in the listed zones. Optionally, plot the overall accuracy versus grid spacing and plot the accuracy at each grid node.

Required Parameter:

Parameter	Syntax	Default	Notes
ZONES	= <set>		Indicates the three zones from which to perform the accuracy calculation.

Optional Parameters:

Parameter Syntax	Syntax	Default	Notes
MAXACCURACY	= <double>	2.0	The maximum theoretical accuracy of the solver which generated the solution. Used to limit the calculated accuracy.
DATASETVAR	= <integer>	1	The data set variable with which to perform the accuracy calculation.
PLOTDETAILED ACCURACY	= <boolean>	FALSE	If TRUE, a new frame will be created containing the accuracy calculated at each grid node.
PLOTOVERALL ACCURACY	= <boolean>	FALSE	If TRUE, a new frame will be created containing the 1-norm and max-norm of the estimated error for each solution zone plotted versus grid resolution.

Example: Calculate the accuracy using zones 3, 4 and 5, along with data set variable 7, plotting the overall accuracy:

```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = CFDAnalyzer3
COMMAND = 'CALCULATEACCURACY    ZONES=[3-5]
      DATASETVAR=7
      PLOTOVERALLACCURACY=TRUE'
```

DISPLAYBOUNDARIES

Syntax:
```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = 'CFDAnalyzer3'
COMMAND = 'DISPLAYBOUNDARIES
[optional parameters]
[RAWDATA
<boundaryrawdata>]'
```

Description: Displays boundaries corresponding to a geometry and boundaries specification without actually setting the geometry and boundaries. This macro is generally not useful for those writing macro files, but is recorded when the user clicks the Display Boundaries button in the Geometry and Boundaries dialog in order to duplicate the actions of Tecplot 360 that happen in response to that action. See Section "SETGEOMETRYANDBOUNDARIES" on page 232 for a description of the parameters for this macro.

EXTRACTFLOWFEATURE

Syntax:
```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = CFDAnalyzer3
COMMAND = 'EXTRACTFLOWFEATURE
   [optional parameters]'
```

Description: Extract and display shock surfaces, vortex cores, or separation and attachment lines. Shock surfaces are displayed as iso-surfaces of a new variable, ShockSurface, while vortex cores and separation and attachment lines are displayed as new zones.

Optional Parameters:

Parameter	Syntax	Default	Notes
Feature	= <*flowfeature*>	SHOCKSURFACES	Can be SHOCKSURFACES, VORTEXCORES, or SEPATTACHLINES.
VCOREMETHOD	= <*vcoremethod*>	EIGENMODES	The vortex core extraction method. Can be VORTICITY or EIGENMODES.
EXCLUDEBLANKED	= <boolean>	FALSE	If TRUE, vortex cores and separation/attachment lines will not be calculated in blanked regions.

Example: Extract vortex cores using the eigenmodes method:

```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = CFDAnalyzer3
COMMAND = 'EXTRACTFLOWFEATURE
      FEATURE = VORTEXCORES
      VCOREMETHOD = EIGENMODES'
```

EXTRAPOLATESOLUTION

Syntax:
```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = CFDAnalyzer3
COMMAND = 'EXTRAPOLATESOLUTION ZONES = <set>
   [MAXACCURACY = <double>]'
```

Description: Perform Richardson extrapolation to estimate the true solution from three input solutions on grids of successively finer resolution. Two new zones are added to the current data set. The first contains the extrapolated solution, while the second contains the estimated error.

Required Parameter:

Parameter	Syntax	Default	Notes
ZONES	= <set>		Indicates the three zones from which to perform the accuracy calculation.

Optional Parameter:

Parameter	Syntax	Default	Notes
MAXACCURACY	= <double>	2.0	The maximum theoretical accuracy of the solver which generated the solution. Used to limit the calculated accuracy.

Example: Extrapolate zones 3, 4, and 5, which were calculated with a second order accurate solver:

```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = CFDAnalyzer3
COMMAND = 'EXTRAPOLATESOLUTION    ZONES=[3-5]
      MAXACCURACY = 2
```

INTEGRATE

Syntax:
```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = CFDAnalyzer3
COMMAND = 'INTEGRATE [<set>] [optional parameters]'
```

Description: Perform an integration over the specified zones (or time strands, if INTEGRATEBY is set to TIMESTRANDS). If <set> is not specified, the integration will be performed over all zones (or time

strands). If PLOTAS is set to TRUE, the integration results will be plotted in a new frame.

Optional Parameters:

Parameter	Syntax	Default	Notes
VARIABLEOPTION	= <variableoption>	SCALAR	
XORIGIN	= <double>	0.0	For VARIABLEOPTION = FORCESANDMOMENTS, indicates the origin X-location for moment calculations.
YORIGIN	= <double>	0.0	For VARIABLEOPTION = FORCESANDMOMENTS, indicates the origin Y-location for moment calculations.
ZORIGIN	= <double>	0.0	For VARIABLEOPTION = FORCESANDMOMENTS, indicates the origin Z-location for moment calculations.
SCALARVAR	= <integer>	1	For when VARIABLEOPTION = AVERAGE, MASSWEIGHTEDAVERAGE, WEIGHTEDAVERAGE, MASSFLOWWEIGHTEDAVERAGE, or VECTORAVERAGE. Indicates which variable's average will be calculated.
ABSOLUTE	= <boolean>	FALSE	If TRUE, the absolute value of cell volumes will be used for integration.
EXCLUDEBLANKED	= <boolean>	FALSE	If TRUE, integration will only include non-blanked regions.
XVARIABLE	= <integer>	0	Data set position of the scalar variable or X-component of the vector variable to be integrated.
YVARIABLE	= <integer>	0	Only required for vector integrations. Indicates the Y-component of the vector variable to be integrated.
ZVARIABLE	= <integer>	0	Only required for vector integrations. Indicates the Z-component of the vector variable to be integrated.
INTEGRATEBY	= <integratebyoption>	ZONES	Indicates whether the integration is performed by zones or by time strands.
INTEGRATEOVER	= <integrateoveroption>	CELLS	Specifies cell volumes, planes, or lines.

IRANGE
{
MIN
MAX
SKIP
}
	
	= <integer>
	= <integer>
	= <integer>
		
		1
		0
		1	

JRANGE
{
MIN
MAX
SKIP
}
	
	= <integer>
	= <integer>
	= <integer>
		
		1
		0
		1	

KRANGE
{
MIN
MAX
SKIP
}
	
	= <integer>
	= <integer>
	= <integer>
		
		1
		0
		1	

PLOTRESULTS	= <boolean>	FALSE	Indicated whether the results of the integration will be plotted in a Tecplot 360 frame.
PLOTAS	= <string>	Results	The variable name used to plot integration results. If it contains spaces, surround it with quotes preceded by a backslash (\'). Ignored for forces and moments.

Range Parameters: The I-range, J-range and K-range parameters are used to limit the data altered by the equation. The specification of range indices follow the rules below.

- All indices start with one and go to some maximum index *m*.
- Zero can be used to represent the maximum index *m*; specifying zero tells the command to go to the very last position of the range, that is, the maximum index value *m*. If the maximum index *m* = 15, specifying zero sets the range index to 15.
- Negative values represent the offset from the maximum index. If a value of -2 is specified, and the maximum index *m* is 14, the value used is 14–2, or 12.

You can access your integration results in macros through a variety of specific environment variables. For a list of the variables and how to access them, refer to Section 22 - 7.2 "Accessing Integration Results in Macros" in the User's Manual

Examples:

Example 1:

The following command calculates the mass for all zones by integrating density (variable 4) over cell volumes:

```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = CFDAnalyzer3
COMMAND = 'INTEGRATE  SCALARVAR = 4'
```

Example 2:

Calculate the mass flux across a series of I = constant planes for zones 1, 2, and 3 and plots the results as "Mass Flux." Since the COMMAND string is surrounded by single quotation marks ('), the quotes surrounding the PLOTAS parameter must be preceded by a backslash to avoid a syntax error:

```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = CFDAnalyzer3
COMMAND = 'INTEGRATE  [1-3]  VARIABLEOPTION =  MASSFLOWRATE INTEGRATEOVER =
IPLANES  PLOTRESULTS = TRUE  PLOTAS = \'Mass Flux\' '
```

Example 3:

Calculate the "mass-weighted average" (actually the mass flow-weighted average) of total pressure, variable 7:

```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = CFDAnalyzer3
COMMAND = 'INTEGRATE   [1-3]   VARIABLEOPTION = MASSFLOWWEIGHTEDAVERAGE
SCALARVAR = 7 INTEGRATEOVER = IPLANES PLOTRESULTS = TRUE PLOTAS = \'Mass
Weighted Avg Pt\'  '
```

SAVEINTEGRATIONRESULTS

Syntax:
```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = CFDAnalyzer3
COMMAND = 'SAVEINTEGRATIONRESULTS
FILENAME = <string>'
```

Description: Saves the most recently calculated integration results to a text file.

Required parameter:

Parameter	Syntax		Notes
FILENAME	= <string>		Indicates the name of the file to which to save the results. It may be a new or existing file.

Example: Save the most recent integration results to file E:\users\dave\results.txt. The backslash characters (\) must be escaped with a second backslash character, and the file name is surrounded by quotes (“):

```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = CFDAnalyzer3
COMMAND = ‘SAVEINTEGRATIONRESULTS
FILENAME = “E:\\users\\dave\\results.txt”’
```

SETFIELDVARIABLES

Syntax:
```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = CFDAnalyzer3
COMMAND = ‘SETFIELDVARIABLES
   [optional parameters]’
```

Description: Identifies variables in your data, such as velocity, pressure and temperature, for use in analysis.

Optional Parameters:

Parameter	Syntax	Default	Notes
CONVECTIONVARSAREMOMENTUM	= <boolean>	TRUE	Indicates whether the variables designated for Tecplot 360 vector plots are momentum variables (density * velocity). If FALSE, then the vector variables must represent velocity values.
UVar	= <integer>	0	Specify the variable (by number) to use for the first Vector/ Momentum variable.
VVar	= <integer>	0	Specify the variable (by number) to use for the second Vector/ Momentum variable.
WVar	= <integer>	0	Specify the variable (by number) to use for the second Vector/ Momentum variable.
ID1	= <varid>	NOTUSED	Identification of the first data set variable from which the function will be calculated.
ID2	= <varid>	NOTUSED	Identification of the second data set variable from which the function will be calculated.
VARIABLE1	= <integer>	0	Position of the first variable in the data set.
VARIABLE2	= <integer>	0	Position of the second variable in the data set.

SETFLUIDPROPERTIES

Syntax:
```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = CFDAnalyzer3
COMMAND = ‘SETFLUIDPROPERTIES’ [optional parameters]
```

Description: Set the fluid properties for use by other commands.

Optional Parameters:

Parameter	Syntax	Default	Notes
INCOMPRESSIBLE	= <boolean>	FALSE	If TRUE, indicates an incompressible fluid.
DENSITY	= <double>	1.0	For INCOMPRESSIBLE = TRUE, indicates the density of the fluid.
SPECIFICHEAT	= <double>	2.5	For INCOMPRESSIBLE = TRUE. The value of the fluid's specific heat.
USESPECIFICHEATVAR	= <boolean>	FALSE	For INCOMPRESSIBLE = TRUE.
SPECIFICHEATVAR	= <integer>	1	For INCOMPRESSIBLE = TRUE and USESPECIFICHEATVAR = TRUE. The data set variable that holds the fluid's specific heat.
GASCONSTANT	= <double>	1.0	For INCOMPRESSIBLE = FALSE. The value of the fluid's specific gas constant.
USEGASCONSTANTVAR	= <boolean>	FALSE	For INCOMPRESSIBLE = FALSE.
GASCONSTANTVAR	= <integer>	1	For INCOMPRESSIBLE = FALSE and USEGASCONSTANTVAR = TRUE. The data set variable which holds the fluid's specific gas constant.
GAMMA	= <double>	1.4	For INCOMPRESSIBLE = FALSE. The value of the fluid's ratio of specific heats. Must be between 1 and 5/3.
USEGAMMAVAR	= <boolean>	FALSE	For INCOMPRESSIBLE = FALSE.
GAMMAVAR	= <integer>	1	For INCOMPRESSIBLE = FALSE and USEGAMMAVAR = TRUE. The data set variable that holds the fluid's ratio of specific heats.
VISCOSITY	= <double>	1.0	The value of the fluid's dynamic viscosity.
USEVISCOSITYVAR	= <boolean>	FALSE	
VISCOSITYVAR	= <integer>	1	For USEVISCOSITYVAR = TRUE. The data set variable which holds the fluid's dynamic viscosity.
CONDUCTIVITY	= <double>	1.0	The value of the fluid's conductivity.
USECONDUCTIVITYVAR	= <boolean>	FALSE	
CONDUCTIVITYVAR	= <integer>	1	For USECONDUCTIVITYVAR = TRUE. The data set variable which holds the fluid's conductivity.

Example 1: Set the fluid properties to standard air values in meters/kilograms/seconds units:

```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = CFDAnalyzer3
COMMAND = 'SETFLUIDPROPERTIES
      GASCONSTANT=287
      VISCOSITY=17.8E-6'
      CONDUCTIVITY=2.48E-2
```

Example 2: Set the fluid properties to incompressible with density equal to 1.0 (the default) and specific heat, viscosity and conductivity taken from data set variables 5, 6, and 7:

```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = CFDAnalyzer3
COMMAND = 'SETFLUIDPROPERTIES
      INCOMPRESSIBLE=TRUE
      SPECIFICHEATOPTION=DATASETVAR
      SPECIFICHEATVAR=5
      VISCOSITYOPTION=DATASETVAR
      VISCOSITYVAR=6'
      CONDUCTIVITYOPTION=DATASETVAR
      CONDUCTIVITYVAR=7
```

Syntax:
```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = 'CFDAnalyzer3'
COMMAND = 'SETGEOMETRYANDBOUNDARIES
   [optional parameters]'
[RAWDATA
<boundaryrawdata>]
```

Description: Specify whether the data represent an axisymmetric flow solution (2D Cartesian plots only), whether adjacent zones should be considered to be connected at coincident faces, and specify zone boundaries and their corresponding boundary conditions. Each line of the RAWDATA describes one boundary, and appears in the same format as on the Geometry and Boundaries dialog. For all boundaries, list the boundary condition and the set of zones, separated by a comma. The index range-type boundary follows this with the boundary face, the first starting index, the first ending index, the second starting index and the second ending index. All entries are separated by commas. The boundary condition is one of INFLOW, OUTFLOW, WALL, SLIPWALL, SYMMETRY, EXTRAPOLATED. The boundary face is one of I=1, I=IMAX, J=1, J=JMAX, K=1, and K=KMAX. Refer to Section 22 - 4 "Setting Geometry and Boundary Options" in the User's Manual for more information on boundaries.

Optional Parameters:

Parameter	Syntax	Default	Notes
AXISYMMETRIC	= <boolean>	FALSE	Can only be TRUE if the current plot type is 2D Cartesian. If TRUE, indicates that the data represents an axisymmetric solution.
SYMMETRYVAR	= <XorY>	Y	For AXISYMMETRIC = TRUE. Can be X or Y. Indicates which axis variable is constant along the axis of symmetry.
SYMMETRYVALUE	= <double>	0.0	For AXISYMMETRIC = TRUE. Indicates the value of the SYMMETRYVAR along the axis of symmetry.
CONNECTZONES	= <boolean>	TRUE	If TRUE, indicates that adjacent zones should be connected where boundary faces coincide.
NODETOLERANCE	= <double>	1.0E-6	Indicates how close two nodes must be before they will be considered coincident for the purpose of matching zone faces.
DEFAULTBC	= <string>	EXTRAPOLATED	Indicates the boundary condition that will be applied to all zone boundary faces not connected to adjacent zones or covered by zone boundaries defined by the RAWDATA section.

Example: Specify that the solution data represents an axisymmetric solution about X = 1. Do not allow adjacent zones to be connected. Identify two zone-type boundaries and one zone, face and index-range-type boundary:

```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = 'CFDAnalyzer3'
COMMAND = 'SETGEOMETRYANDBOUNDARIES
      AXISYMMETRIC = TRUE
      SYMMETRYVAR = X
      SYMMETRYVALUE = 1
      CONNECTZONES = FALSE'
RAWDATA
WALL,[2-3]
INFLOW,[4]
OUTFLOW,[1],I=IMAX,1,10,1,20
```


Syntax:
```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = CFDAnalyzer3
```

```
COMMAND = 'SETREFERENCEVALUES
   [optional parameters]'
```

Description: Specify the reference (free-stream) properties of the solution, identify two variables in the current data set for use with other commands.

Optional Parameters:

Parameter	Syntax	Default	Notes
RVELOCITY1ID	= <string>	MACHNUMBER	Identification of the first free-stream velocity component. May be UVELOCITY or MACHNUMBER.
RVELOCITY1	= <double>	0.0	The value of the first free-stream velocity component.
RVELOCITY2ID	= <string>	ANGLEOFATTACK	Identification of the second free-stream velocity component. May be VVELOCITY or ANGLEOFATTACK.
RVELOCITY2	= <double>	0.0	The value of the second free-stream velocity component. NOTE: RVELOCITY1 must be defined before using RVELOCITY2.
RTHERMO1ID	= <string>	DENSITY	Identification of the first free-stream thermodynamic variable. May be PRESSURE or DENSITY.
RTHERMO1	= <double>	1.0	The value of the first free-stream thermodynamic variable.
RTHERMO2ID	= <string>	SPEEDOFSOUND	Identification of the second free-stream thermodynamic variable. May be TEMPERATURE or SPEEDOFSOUND.
RTHERMO2	= <double>	1.0	The value of the second free-stream thermodynamic variable.

SETUNSTEADYFLOWOPTIONS

Syntax:

```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = 'CFDANALYZER3'
COMMAND = 'SETUNSTEADYFLOWOPTIONS
   [SteadyState=<boolean>]
[RAWDATA
<timelevelrawdata>]'
```

Description: Identifies time levels for unsteady flow, or specifies that the solution is steady-state. If the flow is unsteady, the solution time levels are specified in the RAWDATA section. The first line of the RAWDATA section must consist of a single integer indicating the number of solution time levels. This must be followed by the time levels themselves. Each time level must be on a separate line and must consist of a floating-point number (the solution time), as well as one or more integers (the zone numbers for that solution time).

Optional Parameters:

Parameter	Syntax	Default	Notes
STEADYSTATE	= <boolean>	TRUE	If TRUE, indicates that the solution is steady-state, and the RAWDATA, if any, is ignored. If FALSE, indicates that the solution is unsteady, with time levels identified in the RAWDATA section.

Example: The unsteady solution contains three solution time levels of two zones each, representing solution times 0.5, 1.0 and 1.5:

```
$!EXTENDEDCOMMAND
COMMANDPROCESSORID = CFDAnalyzer3
COMMAND = 'SETUNSTEADYFLOWOPTIONS
      STEADYSTATE = FALSE'
RAWDATA
```

```
3
.5   1   2
1.0   3   4
1.5   5   6
```

10 - 3 Parameter Assignment Values

Parameter assignments referenced in the previous section using single angle brackets (<>) not defined in the 12, are defined here. Note that case is not important.

Value Identifier	Allowable Values
<coeffsoption>	GENERAL, DETAILED
<functionname>	IASPECTRATIO, JASPECTRATIO, KASPECTRATIO, ISTRETCHRATIO, JSTRETCHRATIO, KSTRETCHRATIO, IFACESKEWNESS, JFACESKEWNESS, KFACESKEWNESS, CELLDIAGONAL1SKEWNESS, CELLDIAGONAL2SKEWNESS, IJNORMALSSKEWNESS, JKNORMALSSKEWNESS, KINORMALSSKEWNESS, MAXNORMALSSKEWNESS, IORTHOGONALITY, JORTHOGONALITY, KORTHOGONALITY, MINORTHOGONALITY, INONPLANARITY, JNONPLANARITY, KNONPLANARITY, MINNOPLANARITY, JACOBIAN, CELLVOLUME, GRIDIUNITNORMAL, GRIDJUNITNORMAL, GRIDKUNITNORMAL, DENSITY, STAGDENSITY, PRESSURE, STAGPRESSURE, PRESSURECOEF, STAGPRESSURECOEF, PITOTPRESSURE, PITOTPRESSURERATIO, DYNAMICPRESSURE, TEMPERATURE, STAGTEMPERATURE, ENTHALPY, STAGENTHALPY, INTERNALENERGY, STAGENERGY, STAGENERGYPERUNITVOL, KINETICENERGY, UVELOCITY, VVELOCITY, WVELOCITY, VELOCITYMAG, MACHNUMBER, SPEEDOFSOUND, CROSSFLOWVELOCITY, EQUIVALENTPOTENTIALVELRAT, XMOMENTUM, YMOMENTUM, ZMOMENTUM, ENTROPY, ENTROPYMEASURES1, XVORTICITY, YVORTICITY, ZVORTICITY, VORTICITYMAG, SWIRL, VELOCITYCROSSVORTICITYMAG, HELICITY, RELATIVEHELICITY, FILTEREDRELATIVEHELICITY, SHOCK, FILTEREDSHOCK, PRESSUREGRADIENTMAG, DENSITYGRADIENTMAG, XDENSITYGRADIENT, YDENSITYGRADIENT, ZDENSITYGRADIENT, SHADOWGRAPH, DIVERGENCEOFVELOCITY, SUTHERLANDSLAW, ISENTROPICDENSRAT, ISENTROPICPRESRAT, ISENTROPICTEMPRAT, VELOCITY, VORTICITY, MOMENTUM, PERTURBATIONVELOCITY, VELOCITYCROSSVORTICITY, PRESSUREGRADIENT, DENSITYGRADIENT, VELOCITYGRADIENT
<gravitydirection>	MINUSX, MINUSY, MINUSZ, PLUSX, PLUSY, PLUSZ
<integratebyoption>	ZONES, TIMESTRANDS
<integrateoveroption>	CELLS, IPLANES, JPLANES, KPLANES, ILINES, JLINES, KLINES
<normalizationoption>	NONE, MAXIMUMMAGNITUDE, REFERENCEVALUES
<particlefunction>	PARTICLEPATH, STREAKLINE
<releaseoption>	TIMELEVEL, UNITTIME
<specifyoption>	SPECIFY, CALCULATE
<storeoption>	PARTICLEVALUES, FLUIDVALUES
<terminationoption>	TEMPERATURE, ABLATE
<turbulencefunction>	ENERGY, DISSIPATIONRATE, DYNAMICVISCOSITY, FREQUENCY, VISCOSITY
<variableoption>	LENGTHAREAVOLUME, SCALAR, AVERAGE, MASSWEIGHTEDSCALAR, MASSWEIGHTEDAVERAGE, WEIGHTEDAVERAGE, SCALARFLOWRATE, MASSFLOWRATE, MASSWEIGHTEDFLOWRATE, MASSFLOWWEIGHTEDAVERAGE, FORCESANDMOMENTS, VECTORDOTNORMAL, VECTORAVERAGE, VECTORDOTTANGENTIAL
<varid>	PRESSURE, TEMPERATURE, DENSITY, STAGNATIONENERGY, MACHNUMBER, NOTUSED
<XorY>	X, Y

11

Parameter Subcommands

This chapter details secondary or common macro parameter subcommands in Tecplot 360. These subcommands provide a means to access the lower level variables of commands defined in the previous chapter of this manual. Each subcommand can expand to contain one or more parameters or subcommands. All parameters within a subcommand are optional.

Items within single angle brackets (< >) are defined in 12.

<<anchorpos>>

Description: Assign attributes for positioning of objects.

Expands to:

Parameter	Syntax	Default	Notes
{			
X	= <double>		Sets X-value (and THETA-value)
Y	= <double>		Sets Y-value (and R-value)
Z	= <double>		Sets Z-value
THETA	= <double>		Sets THETA-value (and X-value)
R	= <double>		Sets R-value (and Y-value)
}			

Example:

Make a square geometry and place it at a certain XY location:

```
$!ATTACHGEOM
  GEOMTYPE = SQUARE
  POSITIONCOORDSYS = FRAME
  ANCHORPOS
    {
    X = 2.89124668435
```

```
    Y = 88.7359084881
    }
  RAWDATA
5.23430593312
```

<<areastyle>>

Description: Change settings for the axis grid area.

Expands to:

Parameter	Syntax	Default	Notes
{			
DRAWGRIDLAST	= <boolean>		Not available in 3D frame mode.
DRAWBORDER	= <boolean>		
LINETHICKNESS	<op> <dexp>		
COLOR	= <color>		
ISFILLED	= <boolean>		
FILLCOLOR	= <color>		
USELIGHTSOURCETO	= <boolean>		Only available for 3D frame mode.
FIL			
}			

Example: Turn on the grid area border for a 2D plot and change the line thickness to be 2 percent:

```
$!TWODAXIS
AREASTYLE
{
 DRAWBORDER = YES
 LINETHICKNESS = 2
}
```

<<axisdetail>>

Description: Assign attributes for axes.

Expands to:

Parameter	Syntax	Default	Notes
{			
SHOWAXIS	= <boolean>		
AUTOGRID	= <boolean>		
ISREVERSED	= <boolean>		
GRANCHOR	= <double>		
GRSPACING	= <double>		
RANGEMIN	= <double>		
RANGEMAX	= <double>		
COORDSCALE	= <coordscale>		XY and Polar Line plots only.
CLIPDATA	= <boolean>		
VALUEATORIGIN	= <double>		
VARNUM	= <integer>		Available for 2D and 3D plot types only. Refer to "$!LINEMAP" on page 157 for information on referencing variable number for XY and Polar Line plots.
TICKLABEL	<<ticklabeldetail>>		
GRIDLINES	<<gridlinedetail>>		
MINORGRIDLINES	<<gridlinedetail>>		
MARKERGRIDLINE	<<gridlinedetail>>		
TICKS	<<ticklabeldetail>>		
TITLE	<<axistitle>>		
AXISLINE	<<axisline>>		
}			

Example: Turn on the axis line, reverse the axis direction, and set the range to go from 0.5 to 1.5 for the X-axis in a 2D plot:

```
$!TWODAXIS
SHOWAXISLINE = TRUE
XDETAIL
{
 ISREVERSED = TRUE
 RANGEMIN   = 0.5
 RANGEMAX   = 1.5
}
```

<<axisline>>

Description: Assign attributes for axis lines.

Expands to:

Parameter	Syntax	Default	Notes
{			
SHOW	= <boolean>		
SHOWBOTHDIRECTIONS	= <boolean>	FALSE	Non-3D only.
SHOWPERPENDICULAR	= <boolean>	FALSE	Non-3D only.
SHOWOPPOSITEEDGE	= <boolean>	FALSE	3D only
COLOR	= <color>		
LINETHICKNESS	= <double>		
ALIGNMENT	<axisalignment>		
OPPOSINGAXISVALUE	= <double>		
POSITION	= <double>		
ANGLE	= <double>		
OFFSET	= <double>		
EDGE	= <integer>		
}			

Example: Change the thickness of the Theta-axis line to 0.8 and the color to red.:

```
$!POLARAXIS THETADETAIL{AXISLINE{COLOR = RED}}
$!POLARAXIS THETADETAIL{AXISLINE{LINETHICKNESS = 0.8}}
```

<<axistitle>>

Description: Assign attributes for titles.

Expands to:

Parameter	Syntax	Default	Notes
{			
SHOWONAXISLINE	= <boolean>	TRUE	
SHOWONGRIDBORDERMIN	= <boolean>	FALSE	Non-3D only.
SHOWONGRIDBORDERMAX	= <boolean>	FALSE	Non-3D only.
SHOWONOPPOSITEEDGE	= <boolean>	FALSE	3D only.
SHOWONALLAXES	= <boolean>	TRUE	Polar R only.
SHOWONVIEWPORTTOP	= <boolean>	TRUE	Polar only.
SHOWONVIEWPORTBOTTOM	= <boolean>	TRUE	Polar only.
SHOWONVIEWPORTLEFT	= <boolean>	TRUE	Polar only.
SHOWONVIEWPORTRIGHT	= <boolean>	TRUE	Polar only.
TITLEMODE	= <axistitlemode>		
TEXT	= <string>		
COLOR	= <color>		
TEXTSHAPE	<<textshape>>		
OFFSET	= <double>		
PERCENTALONGLINE	= <double>	50%	
}			

Example: Create a R-axis title, saying “Harmonic Motion” in red, times, size 6 font.:

```
$!POLARAXIS RDETAIL{TITLE{TEXT = 'Harmonic Motion'}}
$!POLARAXIS RDETAIL{TITLE{OFFSET = -4}}
$!POLARAXIS RDETAIL{TITLE{COLOR = RED}}
```

```
$!POLARAXIS RDETAIL{TITLE{TEXTSHAPE{FONTFAMILY = “Times”}}}
$!POLARAXIS RDETAIL{TITLE{TEXTSHAPE{ISBOLD = NO}}}
$!POLARAXIS RDETAIL{TITLE{TEXTSHAPE{ISITALIC = NO}}}
$!POLARAXIS RDETAIL{TITLE{TEXTSHAPE{HEIGHT = 6}}}
```

<<basiccolorcontrol>>

Description: Assign name to a basic color .

Expands to:

Parameter	Syntax	Default	Notes
{			
NAME	= <string>	‘’	May include dynamic text variables
SHOW	= <boolean>	YES	Controls visibility of the basic color in a basic color legend.
}			

Example: Change the medium line pattern length for drop-down menus in the interface to be five percent:

```
$!BASICSIZE
LINEPATLENGTHS
{
 MEDIUM = 5
}
```

<<basicsizelist>>

Description: Assign basic sizes. The units for the values assigned here are dependent on the parent command. Assignments here do not affect the plot. These assignments are used only to configure drop-down menus in the interface so the user can make quick selections.

Expands to:

Parameter	Syntax	Default	Notes
{			
TINY	<op> <dexp>		
SMALL	<op> <dexp>		
MEDIUM	<op> <dexp>		
LARGE	<op> <dexp>		
HUGE	<op> <dexp>		
}			

Example: Change the medium line pattern length for drop-down menus in the interface to be five percent:

```
$!BASICSIZE
LINEPATLENGTHS
{
 MEDIUM = 5
}
```

<<colormapcontrolpoints>>

Description: All contour color maps except the Raw user-defined color map make use of control points to determine the color distribution. Each control point has a position and a left and right color. The **<<***colormapcontrolpoints***>>** subcommand can contain more than one `CONTROLPOINT` subcommand.

Expands to:

Parameter	Syntax	Default	Notes
{			
CONTROLPOINT	<integer>		Use <integer> to specify which control point to modify.
{			
COLORMAPFRACTION	<op> <dexp>		Positions the control point; 0 sets the position to the lowest index and 1 to the highest index in the color map.
LEADRGB	<<rgb>>		
TRAILRGB	<<rgb>>		
}			
}			

Example: Change the lead RGB values for control point 2 in the small rainbow color map to be 100, 0, 0:

```
$!COLORMAP
SMRAINBOW
{
 CONTROLPOINT 2
 {
 LEADRGB
  {
   R = 100
   G =   0
   B =   0
  }
 }
}
```

<<colormapoverride>>

Description: Change settings for a color map override. Color map overrides are used to replace a specific band in a contour color map with one of the 16 basic colors.

Expands to:

Parameter	Syntax	Default	Notes
{			
INCLUDE	= <boolean>		
COLOR	= <color>		
STARTLEVEL	<op> <integer>		
ENDLEVEL	<op> <integer>		
}			

Example: Set the color used between contour level number 1 to number 3 to be purple. Use color map override number 3:

```
$!GLOBALCONTOUR
COLORMAPFILTER
{
 COLORMAPOVERRIDEACTIVE = YES
 COLORMAPOVERRIDE 3
 {
  INCLUDE = YES
  COLOR = PURPLE
  STARTLEVEL = 1
  ENDLEVEL   = 3
 }
}
```

<<continuouscolor>>

Description: Change settings for continuous color.

Expands to:

Parameter	Syntax	Default	Notes
CMIN	= <double>		
CMAX	= <double>		

Example: Set the continuous color.

```
$!GLOBALCONTOUR VAR = 4
$!FIELDLAYERS SHOWCONTOUR = YES

$!GLOBALCONTOUR COLORMAPFILTER
  {COLORMAPDISTRIBUTION = CONTINUOUS}
$!GLOBALCONTOUR COLORMAPFILTER
  {
   CONTINUOUSCOLOR
    {
     CMIN = 0.5
     CMAX = 2
    }
  }
```

Description: Describes the placement for a dialog.

Expands to:

Parameter	Syntax	Default	Notes
{			
ANCHORALIGNMENT	= <anchoralignment>		
ANCHORHORIZONTALINSIDE	= <boolean>		ANCHORHORIZONTALINSIDE and ANCHORVERTICALINSIDE control how the dialog window is anchored in both the horizontal and vertical directions relative to the Tecplot 360 main window.
ANCHORVERTICALINSIDE	= <boolean>		
MINVISIBILITYPERCENTAGE	= <integer>		The MINVISIBILITYPERCENTAGE specifies the minimum percentage of the dialog, between 1 and 100, that must be visible within the desktop. This prevents a dialog from being placed outside of the visible desktop. Note that not all window managers allow dialogs to be placed so that the portions of the dialog are not visible and in effect enforce a value of 100.
IOFFSET	= <integer>		IOFFSET and JOFFSET are in pixels. They may be negative, but will be truncated to the bounding rectangle of the Tecplot 360 main window.
JOFFSET	= <integer>		
POSITIONATANCHOR	= <positionatanchor>		POSITIONATANCHOR specifies when to place it at the anchor, NEVER, ONCE (initial launch), or ALWAYS.
}			

Example: Set the position of the Colormap dialog to always launch 10 pixels from Tecplot 360's bottom-right corner:

```
$!INTERFACE
DIALOGPLACEMENT
{
 COLORMAPDIALOG
 {
 ANCHORALIGNMENT = BOTTOMRIGHT
 IOFFSET = 100
 JOFFSET = 100
 POSITIONATANCHOR = ALWAYS
 }
}
```


Description: Change settings for the axis grid area.

Expands to:

Parameter	Syntax	Default	Notes
{			
DRAWBORDER	= <boolean>		Not available in 3D.
LINETHICKNESS	<op> <dexp>		
COLOR	= <color>		Not available for 3D or Polar Line.
ISFILLED	= <boolean>		
FILLCOLOR	= <color>		
USELIGHTSOURCETOFILL	= <boolean>		Only available for 3D.
LABELSALLSIDES	= <boolean>		
TICKSALLSIDES	= <boolean>		
EXTENTS	<<rect>>		Not available in 3D.
}			

Example: Turn on the grid area border for a 2D plot and change the line thickness to be 2 percent:

```
$!TWODAXIS
GRIDAREA
{
 DRAWBORDER = YES
 LINETHICKNESS = 2
}
```

<<gridlinedetail>>

Description: Change settings for axis gridlines.

Expands to:

Parameter	Syntax	Default	Notes
{			
COLOR	= <color>		
SHOW	= <boolean>		
LINEPATTERN	= <linepattern>		
PATTERNLENGTH	<op> <dexp>		
LINETHICKNESS	<op> <dexp>		
CUTOFF	= <double>		Theta only.
DRAWGRIDLAST	= <boolean>		Drawing last places the grid at the front of the plot; drawing first places it in the back
POSITIONMARKERBY	= <markerpos>		Marker gridline only
CONSTANTVALUE	= <double>		Marker gridline only; valid only when POSITIONMARKERBY is CONSTANT
}			

Example: Set the line pattern for minor gridlines for the X-axis in a 3D plot to be dashed:

```
$!THREEDAXIS
XDETAIL
{
 MINORGRIDLINES
 {
  LINEPATTERN = DASHED
```

```
  }
 }
```

<<ijk>>

Description: Set an I-, J-, or K-index.

Expands to:

Parameter	Syntax	Default	Notes
{			
I	<op> <integer>		
J	<op> <integer>		
K	<op> <integer>		
}			

Example: Set the I- and J-index skip for vectors to 2 for all zones:

```
$!FIELDMAP
VECTOR
{
 IJKSKIP
 {
 I = 2
 J = 2
 }
}
```

<<indexrange>>

Description: Set an index range.

Expands to:

Parameter	Syntax	Default	Notes
{			
MIN	<op> <integer>		
MAX	<op> <integer>		
SKIP	<op> <integer>		
}			

Example: Change the plot so the data set shows I-planes 3, 5, and 7 for zones 1 to 3:

```
$!FIELDMAP [1-3]
SURFACES
{
 SURFACESTOPLOT = IPLANES
 IRANGE
 {
   MIN = 3
   MAX = 7
   SKIP = 2
```

```
  }
 }
```

<<numberformat>>

Description: Set the format used to draw a number.

Expands to:

Parameter	Syntax	Default	Notes
{			
FORMATTING	= <valueformat>		
CUSTOMLABEL	= <integer>		
DYNAMICLABELNAME	= <string>		Name of the dynamic label generator to use when "Formatting" is set to "DynamicLabel"
PRECISION	<op> <integer>		
SHOWDECIMALSONWHOLENUMBERS	= <boolean>	FALSE	
REMOVELEADINGZEROS	= <boolean>	FALSE	
SHOWNEGATIVESIGN	= <boolean>	TRUE	
POSITIVEPREFIX	= <string>		
POSITIVESUFFIX	= <string>		
NEGATIVEPREFIX	= <string>		
NEGATIVESUFFIX	= <string>		
TIMEDATEFORMAT	= <string>		
ZEROPREFIX	= <string>		
ZEROSUFFIX	= <string>		
}			

Example: Set the number format for axis labels on the X-axis in a 2D field plot to use the "float" format with a precision of 3, and add the phrase "DAYS WITHOUT RAIN" after every positive value:

```
$!TWODAXIS
XDETAIL
{
 TICKLABEL
 {
  NUMFORMAT
  {
   FORMATTING = FIXEDFLOAT
    PRECISION = 3
      POSITIVESUFFIX = "DAYS WITHOUT RAIN"
  }
 }
}
```

Example: Set the number format for axis labels on the X-axis in a 2D field plot to use the Time/Date format. Add the time and date in format

<<papersize>>

Description: Change dimensions or hardclip offsets for LETTER, DOUBLE, A3, A4, CUSTOM1 and CUSTOM2 paper sizes.

Expands to:

Parameter	Syntax	Default	Notes
{			All values are in inches.
WIDTH	<op> <dexp>		
HEIGHT	<op> <dexp>		
LEFTHARDCLIPOFFSET	<op> <dexp>		
RIGHTHARDCLIPOFFSET	<op> <dexp>		
TOPHARDCLIPOFFSET	<op> <dexp>		
BOTTOMHARDCLIPOFFSET	<op> <dexp>		
}			

Example: Change the left hardclip offset for LETTER size paper to be 0.25 inches:

```
$!PAGE
PAPERSIZEINFO
{
 LETTER
 {
  LEFTHARDCLIPOFFSET = 0.25
 }

}
```

<<precisegrid>>

Description: Change settings for the precise dot grid.

Expands to:

Parameter	Syntax	Default	Notes
{			
INCLUDE	= <boolean>		
COLOR	= <color>		
SIZE	= <double>		Size is in centimeters.
}			

Example: Turn on the precise dot grid in an XY-plot:

```
$!XYAXIS
PRECISEGRID
  {
   INCLUDE = YES
  }
```

<<rect>>

Description: Change settings for a rectangle. The rectangle is defined using two points (X1,Y1) and (X2,Y2).

Expands to:

Parameter	Syntax	Default	Notes
{			Units are based on the parent command.
X1	<op> <dexp>		
Y1	<op> <dexp>		
X2	<op> <dexp>		
Y2	<op> <dexp>		
}			

Example: Set the 2D axis grid area to be positioned 10 percent from all edges of the frame:

```
$!TWODAXIS
AREASTYLE
{
 EXTENTS
 {
  X1 = 10
  Y1 = 10
  X2 = 90
  Y2 = 90
 }
}
```

<<refscatsymbol>>

Description: Set the attributes for the reference scatter symbol.

Expands to:

Parameter	Syntax	Default	Notes
{			
SHOW	= <boolean>		
COLOR	= <color>		
LINETHICKNESS	= <dexp>		
ISFILLED	= <boolean>		
FILLCOLOR	= <color>		
MAGNITUDE	= <dexp>		
XYPOS	<<xyz>>		
SYMBOLSHAPE	<<symbolshape>>		
}			

Example: Change the fill color of the reference scatter symbol to be green:

```
$!GLOBALSCATTER
REFSCATSYMBOL
{
 FILLCOLOR = GREEN
}
```

Description: Set the attributes for OpenGL rendering.

Expands to:

Parameter	Syntax	Default	Notes
{			
POLYGONOFFSET EXTBIASFACTOR	= <double>		
STIPPLEALLLINES	= <stipplemode>		If thin patterned lines are not drawn correctly, set STIPPLEALLLINES to ALL.
DEPTHBUFFERSIZE	= <integer>		For low memory graphics cards, the depth buffer size may need to be reduced.
MINBITSPERRGB PLANE	= <integer>		Specify the minimum number of bits used for each of the planes in the image buffer.
DOEXTRADRAWFOR LASTPIXEL	= <boolean>		Sometimes the last pixel for stroked font characters is not drawn If so, turn DOEXTRADRAWFORLASTPIXEL on.
MAXMULTISAMPLES	= <integer>		Sets the number of multisamples used for antialising. Default: 4 for screen, 0 for offscreen.
MAXSTRIPLENGTH	= <integer>		Some graphics cards have problems with long strips. Use MAXSTRIPLENGTH to reduce the strip length.
MAXPRIMATIVESPER BLOCK	= <integer>		Some graphics cards have problems with large numbers of graphics primitives in a single block. Use MAXPRIMATIVESPERBLOCK to reduce the number of primitives delivered to the graphics hardware in a single block.
CONSTANTLYUSE SCISSORING	= <boolean>		Turn ConstantlyUseScissoring on if you see lines extending outside the borders of the frame. There is a slight performance penalty when using this option.
USEQUADSTRIPS	= <boolean>		If some shaded or contour flooded quads or triangles do not appear or are black, try turning this off.
USETRIANGLE STRIPS	= <boolean>		As with USEQUADSTRIPS, try turning off USEQUADSTRIPS before turning USETRIANGLESTIPS off. Turning off both options will result in reduced performance, but may help fix errors caused by buggy graphics card drivers.
TRIANGULATE FILLEDPOLYGONS	= <boolean>		As with USEQUADSTRIPS, try turning on TRIANGULATEFILLEDPOLYGONS if you are still experiencing problems even after turning off USETRIANGLESTRIPS and USEQUADSTRIPS.
USEGLCOLOR MATERIALFUNCTION	= <boolean>		Some graphics cards have problems with an OpenGL's **glColorMaterial** function. Higher performance (especially for continuous contour flooded plots) can be achieved when it is used. However, it may need to be turned off if you are experiencing problems.
MAXTEXTURESIZE	= <integer>		
FORCESMOOTHSHADI NGFORLIGHTING	= <boolean>		
ADJUSTRECTANGLE RIGHTANDBOTTOM	= <boolean>		
}			

Example: Force all line drawing to include the last point in the line. Also, make the size of the depth buffer to be at least 32 bits.

```
$!INTERFACE
OPENGLCONFIG
{
  SCREENRENDERING
   {
     DOEXTRADRAWFORLASTPIXEL = TRUE
     DEPTHBUFFERSIZE = 32
```

```
    }
}
```

<<rgb>>

Description: Set a color value by assigning values to its red, green, and blue components.

Expands to:

Parameter	Syntax	Default	Notes
{			
R	<op> <integer>		
G	<op> <integer>		
B	<op> <integer>		
}			

Example: Change the CUSTOM3 basic color to be light green:

```
$!BASICCOLOR
CUSTOM 3
{
 R =  80
 G = 255
 B =  80
}
```

<<shademap>>

Description: Map colors on the screen to shades of gray for monochrome hardcopy output.

Expands to:

Parameter	Syntax	Default	Notes
{			Shade values can range from 0 (black) to 100 (white).
BLACKSHADE	= <dexp>		
REDSHADE	= <dexp>		
GREENSHADE	= <dexp>		
BLUESHADE	= <dexp>		
CYANSHADE	= <dexp>		
YELLOWSHADE	= <dexp>		
PURPLESHADE	= <dexp>		
WHITESHADE	= <dexp>		
CUSTOM1SHADE	= <dexp>		
CUSTOM2SHADE	= <dexp>		
CUSTOM3SHADE	= <dexp>		
CUSTOM4SHADE	= <dexp>		
CUSTOM5SHADE	= <dexp>		
CUSTOM6SHADE	= <dexp>		
CUSTOM7SHADE	= <dexp>		
CUSTOM8SHADE	= <dexp>		
}			

Example: Make blue flooded regions map to 50 percent gray:

```
$!PRINTSETUP
MONOFLOODMAP
{
 BLUESHADE = 50
}
```

<<symbolshape>>

Description: Set a symbol shape. Symbols can be a geometric shape (circle, square, and so forth) or an ASCII character.

Expands to:

Parameter	Syntax	Default	Notes
{			
ISASCII	= <boolean>		
ASCIISHAPE			
{			
USEBASEFONT	= <boolean>		
FONTOVERRIDE	= <font>		
ASCIICHAR	= <string>		
}			
GEOMSHAPE	= <geomshape>		
}			

Example: Change the symbol shape for symbols drawn with line map 3 to use circles:

```
$!LINEMAP[3]
SYMBOLS
{
 SYMBOLSHAPE
 {
  ISASCII = FALSE
  GEOMSHAPE = CIRCLE
 }
}
```

<<textbox>>

Description: Change settings for the optional box around a text label.

Expands to:

Parameter	Syntax	Default	Notes
{			
BOXTYPE	= <textboxtype>		
MARGIN	<op> <dexp>		
LINETHICKNESS	<op> <dexp>		
COLOR	= <color>		
FILLCOLOR	= <color>		
}			

Example: See example for <<textbox>> is incorporated in the example for <<textshape>>.

<<textshape>>

Description: Change settings related to text font and character height.

Expands to:

Parameter	Syntax	Default	Notes
{			
FONTFAMILY	= <string>		
ISBOLD	= <boolean>		
ISITALIC	= <boolean>		
SIZEUNITS	= <sizeunits>		
HEIGHT	<op> <dexp>		
}			

Example: Add a text label in the center of the frame using Times Roman font. Make the text height 12 point. Include a box around the text with a line thickness of one percent:

```
$!ATTACHTEXT
XYPOS {
 X = 50
 Y = 50
}
TEXTSHAPE
{
 FONTMFFAMILY = “Times”
 ISBOLD = NO
 ISITALIC = NO
}
BOX
{
 BOXTYPE = HOLLOW
 LINETHICKNESS = 1
}
TEXT = ’Hi Mom’
```

<<ticklabeldetail>>

Description: Change settings for the text used to label axis tick marks.

Expands to:

Parameter	Syntax	Default	Notes
{			
SHOWONAXISLINE	= <boolean>	TRUE	
SHOWONGRIDBORDERMIN	= <boolean>	FALSE	Non-3D only.
SHOWONGRIDBORDERMAX	= <boolean>	FALSE	Non-3D only.
SHOWONOPPOSITEEDGE	= <boolean>	FALSE	3D only.
SHOWONALLAXES	= <boolean>	TRUE	Polar R only.
SHOWATAXISINTER	= <boolean>		
SECTION			
SKIP	= <integer>		
ERASEBEHINDLABELS	= <boolean>		
NUMFORMAT	<<numberformat>>		
TEXTSHAPE	<<textshape>>		Not allowed to change size units parameter.
OFFSET	<op> <dexp>		
LABELALIGNMENT	= <labelalignment>		
ANGLE	<op> <dexp>		
COLOR	= <color>		
}			

Example: Change the color for X-axis tick mark labels in a 2D plot to be red:

```
$!TWODAXIS
XDETAIL
{
 TICKLABEL
 {
  COLOR = RED
 }
}
```

<<tickmarkdetail>>

Description: Assign attributes for axis tick marks.

Expands to:

Parameter	Syntax	Default	Notes
{			
SHOWONAXISLINE	= <boolean>	**TRUE**	
SHOWONGRIDBORDERMIN	= <boolean>	FALSE	Non-3D only.
SHOWONGRIDBORDERMAX	= <boolean>	FALSE	Non-3D only.
SHOWONOPPOSITEEDGE	= <boolean>	FALSE	3D only.
SHOWONALLAXES	= <boolean>	TRUE	Polar R only.
TICKDIRECTION	= <tickdirection>		
LENGTH	<op> <dexp>		
LINETHICKNESS	<op> <dexp>		
NUMMINORTICKS	= <integer>		
MINORLENGTH	= <double>		
MINORLINETHICKNESS	= <double>		
}			

Example: Set the tick mark length to 2 percent for the second Y-axis in an XY-plot:

```
$!XYLINEAXIS
YDETAIL 2
{
 TICKS
 {
  LENGTH = 2
     SHOWONGRIDBORDERMIN = TRUE
 }
}
```

<<volumeobjectstoplot>>

Description: Specifies what volume objects are to be displayed.

Expands to:

Parameter	Syntax	Default	Notes
{			
SHOWISOSURFACES	= <boolean>		
SHOWSLICES	= <boolean>		
SHOWSTREAMTRACES	= <boolean>		
}			

Example:

```
$!FIELD
VOLUMEMODE
 {
  VOLUMEOBJECTSTOPLOT
   {
    SHOWISOSURFACES = NO
    SHOWSLICES = YES
    SHOWSTREAMTRACES = YES
   }
 }
```

<<xy>>

Description: Change settings for an (X,Y) position.

Expands to:

Parameter	Syntax	Default	Notes
{			
X	<op> <dexp>		
Y	<op> <dexp>		
}			

Example: See the XYPOS parameter in the example for <<*textshape*>>.

<<xyz>>

Description: Change settings for an (X, Y, Z) triplet.

Expands to:

Parameter	Syntax	Default	Notes
{			
X	<op> <dexp>		
Y	<op> <dexp>		
Z	<op> <dexp>		
}			

Example: Change the scale factor on the Z-axis to be 0.5:

```
$!GLOBALTHREED
AXISSCALEFACT
{
 Z = 0.5
}
```

<<zebrashade>>

Description: Change zebra shading attributes.

Expands to:

Parameter	Syntax	Default	Notes
{			
INCLUDE	= <boolean>		
ISTRANSPARENT	= <boolean>		
COLOR	= <color>		
}			

Example: Turn on zebra shading and make the zebra shade color to be black:

```
$!GLOBALCONTOUR
COLORMAPFILTER
{
 ZEBRA
 {
  INCLUDE = TRUE
  COLOR   = BLACK
 }
}
```

12

Parameter Assignment Values, Expressions, and Operators

12 - 1 Assignment Value Table

Parameter assignments referenced in the previous chapters using single angle brackets (< >) are defined here. (Case is not important.)

Value Identifier	Allowable Values		
<altmousebuttonmode>	REDRAW	REVERTTOSELECT	
<addonstyle>	V7STANDARD	V7ACTIVEX	
<anchoralignment>	TOPLEFT	TOPCENTER	TOPRIGHT
	MIDDLELEFT	MIDDLECENTER	MIDDLERIGHT
	BOTTOMLEFT	BOTTOMRIGHT	BOTTOMCENTER
<anglespec>	RADIANS	DEGREES	
<arrowheadattachment>	NONE	ATBEGINNING	ATEND
	ATBOTHENDS		
<arrowheadstyle>	PLAIN	FILLED	HOLLOW
<axisalignment>	WITHVIEWPORT	WITHSPECIFICANGLE	
	WITHGRIDMIN	WITHGRIDAREABOTTOM	
	WITHGRIDMAX	WITHGRIDAREARIGHT.	
	WITHGRIDAREATOP	WITHGRIDAREALEFT	
	WITHOPPOSINGAXISVALUE		
<axismode>	INDEPENDENT	XYDEPENDENT	XYZDEPENDENT
<axistitlemode>	USEVARNAME	USETEXT	
<axistitleposition>	LEFT	CENTER	RIGHT
<backingstoremode>	REALTIMEUPDATE	NOTUSED	PERIODICUPDATE
<bitdumpregion>	CURRENTFRAME	ALLFRAMES	WORKAREA

Value Identifier	Allowable Values		
<boolean>	YES	NO	
	TRUE	FALSE	
	ON	OFF	
<borderlocation>	IBORDER	JBORDER	KBORDER
<boundarycondition>	FIXED	ZEROGRADIENT	ZERO2ND
<boxtype>	NONE	FILLED	HOLLOW
<charactersequence>	`One or more printable characters.`		
<clipping>	CLIPTOVIEWPORT	CLIPTOFRAME	
<clipplane>	BELOWPRIMARYSLICE	ABOVEPRIMARYSLICE	NONE
<color>	BLACK	RED	GREEN
	BLUE	CYAN	YELLOW
	PURPLE	WHITE	CUSTOM1 to CUSTOM56
	MULTI1 to MULTI4 [a]	RGBCOLOR	
<colormap>	<standardcolormap>	WILD	USERDEF
	RAWUSERDEF		
<colormapcontrol>	COPYSTANDARD	REDISTRIBUTECONTROLPOINTS	
	RESETTOFACTORY		
<colormapdistribution>	BANDED	CONTINUOUS	
<compressiontype>	BESTSPEED	SMALLESTSIZE	
<conditionalexp>	<dexp> <relop> <dexp>	<string> <relop> <string>.	
<constrainintop2mode>	USEVAR	USECONSTANT	
<contourcoloring>	RGB	GROUP1 to GROUP4	
<contourlabelaction>	ADD	DELETEALL	
<contourlabellocation>	COLORMAPDIVISIONS	INCREMENT	CONTOURLEVELS
<contourlevelaction>	ADD	NEW	DELETERANGE
	DELETENEAREST	RESET	
<contourlinemode>	USEZONELINETYPE	SKIPTOSOLID	DASHNEGATIVE
<contourtype>	LINES	FLOOD	AVERAGECELL
	PRIMARYVALUE	BOTHLINESANDFLOOD	
<coordscale>	LINEAR	LOG	
<coordsys>	GRID	FRAME	GRID3D
<curveinfomode>	CURVEDETAILS	CURVEPOINTS	
<curvetype>	LINESEG	CURVFIT	SPLINE
	PARASPLINE	ETORFIT	POWERFIT
	EXTENDED	POLYNOMIALFIT	
<datatype>	SINGLE	DOUBLE	LONGINT
	SHORTINT	BYTE	BIT
<dataloadstrategy>	AUTO	HEAP	

Value Identifier	Allowable Values		
<derivpos>	SIMPLE	ATPOINT	COMPLEX
	ATPOINTB2		
<dialogname>	AXISEDIT	ADVANCED3DCONTROL	
	COLORMAP	CONTOUR	CURVEINFO
	CREATE1DLINE	CREATECIRCULARZONE	
	CREATERECTANGULARZONE		
	CREATEZONEFROMPOLYLINES		
	CREATEZONEFROMVALUES		
	DATAINFO	DATALABELS	DATASPREADSHEET
	DELETEVARIABLES	DELETEZONES	DEPTHBLANKING
	DUPLICATEZONE	EQUATION	EXPORT
	EXTRAEXTRACTDISCRETEPOINTS		EXTRACTFEBOUNDARY
	EXTRACTISOSURFACES		
	EXTRACTPOINTSFROMGEOMETRY		
	EXTRACTPOINTSFROMPOLYLINE		
	EXTRACTSLICEFROMPLANE		
	EXTRACTSLICES	EXTRACTSTREAMTRACES	
	EXTRACTSUBZONE	EXTRACTCONTOURLINES	
	IJKBLANKING	IMPORT	*LIGHTSOURCE*
	INVERSEDISTANCEINTERPOLATION		
	LINEARINTERPOLATION	KRIGINGINTERPOLATION	
	LINEMAPLEGEND	LOADDATA	MACROPLAY
	MACRORECORD	MACROVIEWER	MIRRORZONE
	NEWLAYOUT	OPENLAYOUT	ORDERFRAMES
	PAPERSETUP	PERFORMANCE[b]	
	POLARDRAWINGOPTIONS		PRINT
	PROBEAT	PROBE	QUICKEDIT
	QUICKMACROPANEL	RESET3DAXES	RGBCOLORLEGEND
	RGBCOLORVARSANDRANGE		ROTATE2DDATA
	RULERGRID	SAVEAS	SAVE
	SCATTERLEGEND	SCATTERSIZEANDFONT	
	SCATTERREFERENCESYMBOL		SLICES
	SMOOTH	SPATIALVARS	STREAMTRACES
	STYLELINKING	THREEDAXISLIMITS	
	THREEDVIEWDETAILS	THREEDORIENTATIONAXIS	
	THREEDVIEWROTATE	TRANSFORMCOORDINATES	
	TRANSLATEMAGNIFY	TRIANGULATE	TWODDRAWORDER
	VALUEBLANKING	VECTORLENGTH	

Value Identifier	Allowable Values		
	VECTORARROWHEADS	VECTORREFERENCEVECTOR	
	VECTORVARS	WRITEDATA	ZONEMAPSTYLE
<derivpos>	SIMPLE	ATPOINT	COMPLEX
<dexp>	<double> ((<expression>))		
<double>	`Valid floating point value.`		
<draworder>	BEFOREDATA	AFTERDATA	
<drift>	NONE	LINEAR	QUAD
<edgesetting>	NONE	MIN	MAX
	BOTH		
<edgetype>	BORDERSANDCREASE	BORDERS	CREASES
<epspreviewimagetype>	NONE	TIFF	EPSIV2
	FRAME		
<errorbartype>	UP	DOWN	
	LEFT	RIGHT	
	VERT.	HORZ	
	CROSS		
<exportformat>	RASTERMETAFILE	TIFF	SUNRASTER
	XWINDOWS	PSIMAGE	PS
	EPS	X3D	BMP
	PNG	AVI	JPEG
	WINDOWSMETAFILE	TECPLOTVIEWER	FLV
	MPEG4	WMV	
<expression>	See Figure 12 - 2.		
<fielddatatype>	FLOAT	DOUBLE	
<fillmode>	NONE	USEBACKGROUNDCOLOR	
	USELINECOLOR	USESPECIFICCOLOR	
<font>	HELV	HELVBOLD	TIMES
	TIMESBOLD	TIMESITALIC	TIMESITALICBOLD
	COURIER	COURIERBOLD	GREEK
	MATH	USERDEF	
<frameaction>	DELETETOP	FITALLTOPAPER	POP
	POPATPOSITION	PUSHTOP	
<framecollection>	ALL	PICKED	
<framecoordmode>	PAPER	WORKSPACE	
<framemode>	THREED	TWOD	XY
	SKETCH		
<functiondependency>	XINDEPENDENT	YINDEPENDENT	RINDEPENDENT
	THETAINDEPENDENDT		

Value Identifier	Allowable Values		
<geomshape>	SQUARE	DEL	GRAD
	RTRI	LTRI	DIAMOND
	CIRCLE	CUBE	OCTAHEDRON
	SPHERE	POINT	
<geomtype>	GEOMIMAGE	LINESEGS	RECTANGLE
	SQUARE	CIRCLE	ELLIPSE
	LINESEGS3D		
<ijkblankmode>	INTERIOR	EXTERIOR	
<ijklines>	I	J	K
<ijkplane>	I	J	K
<imagestyle>	ONEPERFRAME	WORKSPACEONLY	
<imagetype>	LOSSLESS	JPEG	256COLOR
<integer>	Integer constants or variables containing an integer. Expressions that logically result in integer are not currently supported.		
<interpptselection>	NEARESTNPOINTS	ALLPOINTS	OCTANTNPOINTS
<isosurfacesselection>	ALLCOUNTOURLEVELS	TWOSPECIFICVALUES	
	THREESPECIFICVALUES	ONESPECIFICVALUE	
<krigdrift>	NONE	LINEAR	QUAD
<labelalignment>	BYANGLE	ALONGAXIS	
	PERPENDICULARTOAXIS		
<labeltype>	INDEX	VARVALUE	XANDYVARVALUE[c]
<lightingeffect>	PANELED	GOURAUD	
<linearinterpmode>	DONTCHANGE	SETTOCONST	
<linepattern>	SOLID	DASHED	DASHDOT
	DOTTED	LONGDASH	DASHDOTDOT
<linktype>	WITHINFRAME	BETWEENFRAMES	
<macrofunctionvar>	|<integer>|		

Value Identifier	Allowable Values		
<macrointrinsic>	AXISMAXX	AXISMAXY	AXISMAXZ
	AXISMINX	AXISMINY	AXISMINZ
	COLORMAPDYNAMIC	ENDSLICEPOS	FRAMEMODE
	IS3DV	LOOP	MACROFILEPATH
	MAXB	MAXC	MAXI
	MAXJ	MAXK	MAXS
	MAXU	MAXV	MAXV*nn*
	MAXW	MAXX	MAXY
	MAXZ	MINB	MINC
	MINS	MINU	MINV
	MINV*nn*	MINW	MINX
	MINY	MINZ	NUMFRAMES
	NUMPLANES	NUMVARS	NUMWIN
	NUMXYMAPS	NUMZONES	OPSYS
	PLATFORMNAME	SOLUTIONTIME	SLICEPLANETYPE
	STARTSLICEPOS	TECHOME	TECPLOTVERSION
<macrointrinsicvar>	|<macrointrinsic>|		
<macroparameter>	<charactersequence> <string>		
<macroparameterlist>	(<macroparameter> <macroparameter>...)		
<macrouserdefvar>	|<charactersequence>|		
<macrovar>	<macrointrinsicvar> <macrouserdefvar> <macrofunctionvar>		
<markerpos>	SOLUTIONTIME	CONSTANTs	
<meshtype>	WIREFRAME	OVERLAY	HIDDENLINE
<mirrorvar>	'X'	'Y'	'Z'
<mousebuttonclick>	REDRAW	REVERTTOSELECT	NOOP
<mousebuttondrag>	NOOP	ZOOMDATA	ZOOMPAPER
		TRANSLATEDATA	TRANSLATEPAPER
		ROLLERBALLROTATE	TWISTROTATE
	SPHERICALXROTATEDATA	SPHERICALYROTATEDATA	SPHERICALZROTATEDATA
	XROTATE	YROTATE	ZROTATE
<mousemode>	ADJUST	ADVANCEADJUST	SELECT
<noncurrentframedrawlevel>	FULL	TRACE	
<objectalign>	BOTTOM	CENTER	TOP
	LEFTJUSTIFY	RIGHTJUSTIFY	
<op>	=	-=	+=
	*=	/=	
<originresetlocation>	DATACENTER	VIEWCENTER	
<palette>	MONOCHROME	PENPLOTTER	COLOR

Value Identifier	Allowable Values		
<papergridspacing>	HALFCENTIMETER	ONECENTIMETER	
	TWOCENTIMETERS	QUARTERINCH	HALFINCH
	ONEINCH	TENPOINTS	TWENTYFOURPOINTS
	THIRTYSIXPOINTS	FIFTYPOINTS	
<paperrulerspacing>	ONEINCH	FIFTYPOINTS	ONECENTIMETER
	TWOCENTIMETERS	SEVENTYTWOPOINTS	
<papersize>	LETTER	DOUBLE	A4
	A3	CUSTOM1	CUSTOM2
<pickaction>	ADD	ADDALL	ADDALLINREGION
	CLEAR	COPY	CUT
	EDIT	MAGNIFY	PASTE
	POP	PUSH	SETMOUSEMODE
	SHIFT		
<placementplaneorientation>	X	Y	Z
<plotapproximationmode>	AUTOMATIC	NONCURRENTALWAYSAPPROX	
	ALLFRAMESALWAYSAPPROX		
<plottype>	CARTESIAN3D	CARTESIAN2D	XYLINE
	POLARLINE	SKETCH	
<pointerstyle>	ALLDIRECTIONS	BOTTOM	LEFT
	LEFTRIGHT	LOWERLEFT	LOWERRIGHT
	RIGHT	TOP	UPDOWN
	UPPERLEFT	UPPERRIGHT	
<pointselection>	NEARESTNPOINTS	ALLPOINTS	OCTANTNPOINTS
<pointstoplot>	SURFACESONLY	ALL	
<positionatanchor>	ONCE	NEVER	ALWAYS
<printerdriver>	PS	EPS	
<printrendertype>	VECTOR	IMAGE	
<quickcolormode>	LINECOLOR	FILLCOLOR	TEXTCOLOR
<readdataoption>	NEW	APPEND	REPLACE
<relop>	<	>	<=
	>=	==	!= (not equal to)
	<> (not equal to).	GREATERTHAN	LESSTHAN
	EQUALTO	NOTEQUALTO	
<resizefilter>	TEXTUREFILTER	BOXFILTER	LANCZOS3FILTER
	LANCZOS2FILTER	BELLFILTER	TRIANGLEFILTER
	BSPLINEFILTER	CUBICFILTER	MITCHELFILTER
	GAUSSIANFILTER		
<rgblegendorientation>	RGB	GBR	BRG
	RBG	BGR	GRB

Value Identifier	Allowable Values		
<rgbmode>	SPECIFYRGB	SPECIFYRG	SPECIFYRB
	SPECIFYGB		
<rotateaxis>	X	Y	Z
	ALPHA	THETA	PSI
	ABOUTVECTOR	TWIST	HORZROLLERBALL
	VERTROLLERBALL		
<rotateoriginlocation>	VIEWER	DEFINEDORIGIN	
<rotationmode>	XYZAXIS	SPHERICAL	ROLLERBALL
<scope>	LOCAL	GLOBAL	
<set>	[<setspecifier> <setspecifier> ...]		
<setspecifier>	<integer> <integer>-<integer>[:<integer>]		
<shadetype>	SOLIDCOLOR	PANELED	GOURAUD
	COLOREDPANELED		
<sidebarsizing>	MAXOFALL	DYNAMIC	
<sizeunits>	GRID	FRAME	POINT
<skipmode>	BYINDEX	BYFRAMEUNITS	
<slicesource>	VOLUMEZONES	SURFACEZONES	LINEARZONES
	SURFACESOFVOLUMEZONES		
<slicesurface>	XPLANES	YPLANES	ZPLANES
	IPLANES	JPLANES	KPLANES
<sortby>	NONE	BYSPECIFICVAR	BYDEPENDENDTVAR
	BYINDEPENDENTVAR		
<specifyrgb>	SPECIFYRGB	SPECIFYRG	SPECIFYRB
	SPECIFYGB		
<spherescatterrenderquality>	LOW	MEDIUM	HIGH.
<standardcolormap>	SMRAINBOW	LGRAINBOW	MODERN
	GRAYSCALE	TWOCOLOR	
<stipplemode>	ALL	CRITICAL	NONE
<streamdirection>	FORWARD	REVERSE	BOTH
<streamdistributionregion>	POINT	RAKE	SURFACESOFACTIVEZONES
	SURFACESOFSELECTEDOBJECTS		
<streamtype>	SURFACELINE	VOLUMELINE	VOLUMERIBBON
	VOLUMEROD	TWODLINE	
<string>	"<charactersequence>" '<charactersequence>'[d]		
<stylebase>	FACTORY	CONFIG	
<subboundary>	ADD	ADDONLY	ALL
	REMOVE		
<sunrasterformat>	OLDFORMAT	STANDARD	BYTEENCODED

Value Identifier	Allowable Values		
<surfacestoplot>	BOUNDARYFACES	ALL	IPLANES
	JPLANES	KPLANES	IJPLANES
	JKPLANES	IKPLANES	IJKPLANES
	EXPOSEDCELLFACE	NONE	
<textanchor>	LEFT	CENTER	RIGHT
	MIDLEFT	MIDCENTER	MIDRIGHT
	HEADLEFT	HEADCENTER	HEADRIGHT
<textboxtype>	NONE	FILLED	HOLLOW
<threedviewchangedrawlevel>	FULL	TRACE	
<thetamode>	DEGREES	RADIANS	ARBITRARY
<tickdirection>	IN	OUT	CENTERED
<tiffbyteorder>	INTEL	MOTOROLA	
<transformation>	POLARTORECT	RECTTOPOLAR	SPHERICALTORECT
	RECTTOSPHERICAL		
<translucency>	`Valid integer from one to 99.`		
<twoddraworder>	BYZONE	BYLAYER	
<unloadstrategy>	MINIMIZEMEMORYUSE	NEVERUNLOAD	AUTO
<valueblankcellmode>	ALLCORNERS	ANYCORNER	PRIMARYVALUE
<valueblankrelop>	LESSTHANOREQUAL	NOTEQUALTO	GREATERTHAN
	LESSTHAN	EQUALTO	
	GREATERTHANOREQUAL		
<valueformat>	INTEGER	FLOAT	EXPONENT
	BESTFLOAT	SUPERSCRIPT	RANGEBESTFLOAT
	CUSTOMLABEL	TIMEDATE	
<valuelocation>	AUTO	NODAL	CELLCENTERED
<varloadmode>	BYNAME	BYPOSITION	
<vectortype>	TAILATPOINT	HEADATPOINT	MIDATPOINT
	HEADONLY		
<viewmode>	FIT	ZOOM	DATAFIT
	SETMAGNIFICATION	AXISFIT	CENTER
	TRANSLATE	LAST	COPY
	PASTE	PUSH	
<windowfunction>	HANN	HAMMING	RECTANGULAR
	TRIANGULAR		
<workspaceviewmode>	FITSELECTEDFRAMES	FITALLFRAMES	FITPAPER
	MAXIMIZE	LASTVIEW	ZOOM
	TRANSLATE		
<xyaxis>	′X′	′Y′	

a. In order to color an object using one of the contour variable groups (i.e. assigning the color to MULTI1, MULTI2, etc.), you must first set the contour variable via the $!GLOBALCONTOUR command.
b. The performance dialog cannot be launched or dropped via the macro language on Windows platforms.
c. Available in XY-plots only
d. The only difference in using single quotes vs. double quotes for strings is that single quotes prevent the processing of the backslash character "\" (that is \n inserts a newline \\ inserts the backslash itself).

12 - 2 Assignment Value Expressions

Simple values are literal constants such as 1, 3, 3.5, 2.5e17. Complex expressions are identified by an equation surrounded by '(' and ')' delimiters.

Expressions can be used within any layout or macro file and support all of the common operators and functions familiar to most C and FORTRAN programmers.

Arithmetic operators include the common multiply, divide, add, and subtract (*, /, + and -), as well as a few others (^ and **) that are worth noting. The raise operator (^, or **) returns the result of raising the first number by the second.

Expressions may also contain macro variables and an assortment of useful functions and constants. Following are tables of supported functions and constants and a short explanation for each:

abs(x)	Absolute value of x.
acos(x)	Arc cosine of x between -1 and 1. Return an angle between 0 and p radians.
asin(x)	Arc sine of x between -1 and 1. Return an angle between -p/2 and p/2 radians.
atan(x)	Arc tangent of x. Return an angle between -p and p radians.
atan2(y,x)	Arc tangent of y/x. Return an angle between -p and p radians.
ceil(x)	Smallest integer larger than or equal to x.
cos(x)	Cosine of x in radians.
cosh(x)	Hyperbolic cosine of x.
exp(x)	Exponential of x.
floor(x)	Largest integer smaller than or equal to x.
frac(x)	Fractional part of x.
int(x)	Integer part of x.
log(x)	Natural logarithm of x.
log10(x)	Logarithm to the base 10 of x.
max(x,y)	Larger of x or y.
min(x,y)	Smaller of x or y.
pow(x,y)	xy.
sin(x)	Sine of x in radians.
sinh(x)	Hyperbolic sine of x.
sqrt(x)	Square root of x.
tan(x)	Tangent of x in radians.
tanh(x)	Hyperbolic tangent of x.

Constants are also supported, as listed in the following table.

BASEe	Natural logarithm base e.
DEG	Degrees per radian.
GAMMA	Euler-Mascheroni constant.
PHI	Golden ratio: $(\sqrt{5} + 1)/2$.
PI	p.
RAD	Radians per degree.

The following table shows the operator precedence and associativity for assignment value expressions. Operators with higher precedence are listed in the higher rows of the table, while operators that are in the same row have the same precedence. The associativity describes how an operator associates with its operand.

Operator Type	Operators	Associativity
Expression	( )	**Left to right.**
Power	^ **	**Right to left.**
Unary	- + !	**Right to left.**
Multiplicative	* /	**Left to right.**
Additive	+ -	**Left to right.**
Relational	> >= < <= == !=	**Left to right.**
Logical AND	&&	**Left to right.**
Logical OR	||	**Left to right.**
Conditional	? :	**Right to left.**

Unlike C, relational expressions do not evaluate to 0 or 1, instead, they evaluate to true or false. As such, they may only be used with other logical operators, or with the conditional operator.

Examples of common expressions used in the Tecplot 360 macro language follow (note that all expressions evaluate to a simple, <dexp>, value):

In addition to the more common operators mentioned above, some relational and logical operators are

```
$!If (|b|^2) > (4*|a|*|c|)
    $!If |a| > 0.0
       $!VarSet |root1| = (-|b| + sqrt(|b|^2 - 4*|a|*|c|) / (2*|a|))
       $!VarSet |root2| = (-|b| - sqrt(|b|^2 - 4*|a|*|c|) / (2*|a|))
    $!EndIf
 $!EndIf

 $!VarSet |area| = (PI*|r|**2)
```

provided to form compound expressions. A relation, <*relation*>, may be constructed and used in conjunction with the conditional operator (? and :) to form compound expressions. The conditional operator (? and :) has the following syntax:

```
<relation> ? <expression if true> : <expression if false>
```

where:

- <*relation*> is a conditional statement that evaluates to true or false, and is formed by any two subexpressions which are compared to one another with one of the relational operators (>, >=,

<, <=, ==, !=) in combination with zero or more of the logical operators: logical Not (!), logical *And* (&&), and logical *Or* (||).

- <*expression if true*> is the <*expression*> that is evaluated if the <*relation*> condition evaluates to TRUE.
- <*expression if false*> is the <*expression*> that is evaluated if the <*relation*> condition evaluates to FALSE.

Examples of compound expressions used in the Tecplot 360 macro language follow (note that all compound expressions evaluate to a simple, <dexp>, value):

```
$!VarSet |value| = (|stress| > |cutoff| ? |cutoff| : |stress|)
$!VarSet |value| = (|x| < 1.5 && |y| <= 5.5 ? |x|^6 : (|x|+|y|)^3.2)
$!VarSet |root| = (|b|^2 > 4*|a|*|c| && |a| > 0.0 ? -|b| + sqrt(|b|^2 -
4*|a|*|c|) / (2*|a|) : 0)
```

It is important not to confuse an expression's relation, <*relation*>, that controls the evaluation of a compound expression, with the conditional expression, <*conditionalexp*>, that controls the execution of control commands such as $!IF and $!WHILE.

For example, the following is a valid macro command since it has a valid expression syntax and a valid control command syntax:

```
$!If |a| > (PI*|r|^2)
    ...
$!EndIf
```

The following is also a valid macro command because, like the last example, it has a valid expression syntax and a valid control command syntax:

```
$!If (|a|^2) == (|b| > 5 ? 1 : 0)
     ...
$!EndIf
```

The following is not a valid macro command since it has an invalid expression syntax and consequently an invalid control command syntax:

```
$!If (|a| > PI*|r|^2)
    ...
$!EndIf
```

As with the invalid example above, if Tecplot 360 encounters a relation, <*relation*>, within an expression, <*expression*> (enclosed within (and) delimiters), it expects to find the conditional operator (? and :) and the two required expressions following the specified relation.

13

Raw Data

Some macro commands contain a "raw data" section. A raw data section is defined by using the keyword `RAWDATA` followed by the raw data values unique to the macro command. Most raw data sections start with a single count value which represents the number of blocks of raw data followed by the blocks of raw data themselves. The following table lists the raw data sections found in Tecplot 360 macros.

Raw Data Name	Value Type(s) per Block	Notes
<arbfielddata>	*N M* *p11 p12 p13 ... p1M* *p21 p22 p23 ....p2M* *...* *pN1 pN2 pN3 ...pNM*	Where: N is the number of points M is the number of variables per data point.
<colormaprawdata>	<integer> <integer> <integer>	Red. Green. Blue.
<contourlevelrawdata>	<dexp>	Contour level.
<extendedcommandrawdata>	<string>	Each line of the RAWDATA section contains an arbitrary text string. The only requirement is that the character sequence "$!" (a dollar sign followed by an exclamation mark) cannot appear anywhere in the section. Comments can be inserted by using # (the octothorp). If encountered, everything to the right of the # (including the # itself) will be ignored.
<geometryrawdata> (Line segment geometry)	<xyrawdata>	Each block contains a block of <xyrawdata>, which forms a single polyline within the geometry.
<geometryrawdata> (3D Line segment)	<xyzrawdata>	Each block contains a block of <xyzrawdata>, which forms a single polyline within the geometry.
<geometryrawdata> (circle)	<dexp>[a]	Only one value supplied. Value is the radius.
<geometryrawdata> (ellipse)	<dexp>[a] <dexp>[a]	Two values supplied. Values are RX and RY.
<geometryrawdata> (rectangle)	<dexp>[a] <dexp>[a]	Two values supplied. Values are width and height.
<geometryrawdata> (square)	<dexp>[a]	Only one value supplied. Value is the width.

Raw Data Name	Value Type(s) per Block	Notes
<xyrawdata>	<dexp> <dexp>	X. Y.
<xyzrawdata>	<dexp> <dexp> <dexp>	X. Y. Z.

a. A count value does not precede the raw data in this case.

Examples:

Example 1:

Raw data for a circle with radius equal to 1.7:

```
RAWDATA
1.7
```

Example 2:

Raw data for a line segment geometry with two segments. Segment 1 has 4 points and segment 2 has 3 points:

```
RAWDATA
2
4
1.5 2.2
1.7 2.4
1.9 2.8
2.1 3.0
3
1.1 1.7
1.2 1.9
1.3 2.0
```

Example 3:

Raw data to define five contour levels:

```
RAWDATA
5
1.5
2.6
3.7
4.9
5.5
```

Example 4:

Raw data to define three RGB values:

```
RAWDATA
3
0   0   0
45  100 100
90  200 200
```

Example 5:

For greater control of contour levels in a macro, set the levels with RAWDATA. This example allows you to choose the number of levels, then sets new levels based on the minimum and maximum values of the current contour variable.

```
$!FIELDLAYERS SHOWCONTOUR = YES
$!Drawgraphics No
$!GLOBALCONTOUR 1 VAR = 4
$!PromptforTextString |numlevels|
 Instructions = "Enter the number of contour levels."
$!Varset |Delta| = ((|maxc| - |minc|)/|numlevels|)

$!CONTOURLEVELS DELETERANGE
  CONTOURGROUP = 1
  RANGEMIN = |minc|
  RANGEMAX = |maxc|
$!Varset |newlevel| = (|minc| + |delta|/2)

$!Loop |numlevels|
$!CONTOURLEVELS ADD
  CONTOURGROUP = 1
  RAWDATA
  1
  |newlevel|

$!Varset |newlevel| += |Delta|
$!Endloop
$!Drawgraphics Yes
$!REDRAW
```

14

Macro Language Limitations

The only macro control commands allowed in stylesheets and layout files are:

```
$!VARSET and $!REMOVEVAR
```

The only SetValue command allowed in color map files is:

```
$!COLORMAP
```

Layout files, stylesheet files and colormap files cannot contain any of the following commands:

```
$!OPENLAYOUT
$!READSTYLESHEET
$!LOADCOLORMAP
```

Only SetValue macro commands are allowed in the Tecplot 360 configuration file.

The `$!LIMITS` command can be used only in the Tecplot 360 configuration file.

The `$!FIELDMAP` and `$!LINEMAP` commands may be used in the configuration file but they may not specify an individual zone or line map. This special use of `$!FIELDMAP` and `$!LINEMAP` allows you to change the default attributes for all zones and line mappings when they are initialized in Tecplot 360.

The file name referenced in the `$!INCLUDEMACRO` command cannot use Tecplot 360 macro variables.

Size limitations:

Maximum number of nested macro function calls	10
Maximum number of nested macro loops	10
Maximum number of nested While-EndWhile loops	Unlimited.
Maximum number of nested If-EndIf loops	Unlimited.
Maximum number of nested macro includes	5
Maximum number of macro commands	200,000
Maximum number of parameters per macro function	20
Maximum number of characters in macro variable name	31

Maximum number of characters in macro function name	Unlimited.
Maximum number of macro variables	400

Part 2 Python Scripting

15

Using Tecplot 360's Python Interpreter

15 - 1 Using Python Scripts with Tecplot 360

A Python interpreter has been added to Tecplot 360 to allow you to harness the automation capabilities of macros and extend Tecplot 360's functionality using standard Python libraries (e.g. FFT) without writing an add-on. You may incorporate Python scripts with Tecplot 360 in several different ways:

1. Using a macro file that calls Python modules.
2. Using the **Python Quick Scripts** dialog.
3. Running standalone Python modules launched via the Play Macro or Script dialog (accessed via **Scripting>Play Macro/Script**).

Refer to Chapter 30: "Working With Python Scripts" in the User's Manual for details on each of the above scenarios.

15 - 2 Installation and Setup

When you install Tecplot 360, a Python interpreter (version 2.7.2) is included in $TEC_360_2013R1/python, where $TEC_360_2013R1 is the directory of your Tecplot 360 installation.

If you would rather use your own Python 2.7.2 installation, set the environment variable TEC_PYTHON_HOME to point to it, and Tecplot 360 will use the specified Python interpreter instead of the included copy.

In order to access your Python scripts via the Tecplot 360 interface, ensure that the following line is included in your tecplot.add file (located at base directory of your Tecplot 360 installation):

```
$!LoadAddon "pythonutil"
```

Python scripts can be accessed via **Scripting>Play Macro/Script**.

It is imperative that your PYTHONHOME and PYTHONPATH environment variables be set properly. Refer to the Section 30 - 5 "Python Installation Notes" in the User's Manual for additional details. This is a Python requirement, not a Tecplot 360 requirement.

Several Python scripting samples have been included for your reference. These scripts are located in your Tecplot 360 installation directory and are also available at www.tecplottalk.com/python.

16

Python Syntax Rules

Tecplot 360's Python commands are wrapper functions to the TecUtil functions included with the Add-on Developer's Kit (ADK). The ADK contains C/C++ functions which are thoroughly documented in the ADK Reference Manual. Each entry in the manual includes an indicator for whether the function is available to the Python interpreter. The syntax required for using Tecplot 360's Python interpreter is described for each function in the ADK Reference Manual as well as the remainder of this chapter.

Refer to www.tecplottalk.com/python for sample Python scripts that you may download and execute.

16 - 1 Import Modules

You must include the following import statements at the start of every Python script you wish to use with Tecplot 360:

```
import TecUtil
import TecVals
```

Both of the above modules are included in your Tecplot 360 distribution. TecUtil contains the TecUtil library function calls. TecVals contains the enumerated values, set value constants and defines required for the TecUtil library.

The TecUtil library will work properly only when you are running Tecplot 360. You can not run Python scripts that use the TecUtil library outside of the Tecplot 360 environment.

You may also include other Python libraries that your script requires, such as NumPy or SciPy. NumPy and SciPy are Python libraries created for scientific computations, such as FFT and linear algebra. You may find it useful to acquire and install these modules. For more information, please visit www.scipy.org.

16 - 2 Basic Syntax Rules

The Python Syntax for each TecUtil command is provided for you in the ADK Reference Manual. If you are already familiar with the C-syntax for the functions you wish to call, you may apply the following syntax rules to the C-syntax of the TecUtil functions:

- **TecUtil function** - In Python, a `TecUtil` function is referenced by `TecUtil.`<*BaseFunctionName*>. For example:

C Syntax	Python Syntax
TecUtilExportCancal()	TecUtil.ExportCancel()
TecUtilFramePop(3)	TecUtil.FramePop(3)

- **Enumerated Type or Defined Value** - In Python, prepend the enumerated type or defined value with "`TecVals.`". For example:

C Syntax	Python Syntax
TecUtilFrameSetPlotType(PlotType_Cartesian3D)	TecUtil.FrameSetPlotType(TecVals.PlotType_Cartesian3D
TecUtilDialogLaunch(Dialog_Probe)	TecUtil.DialogLaunch(TecVals.Dialog_Probe)

If you will be working extensively with enumerated types, you can import the TecVals library into your script by adding the following directive:

```
from TecVals import *
```

This will eliminate the need to append TecVals. However, you may encounter name conflicts between your pre-existing values and items in the TecVals. These errors may cause unexpected behavior.

- **In/Out parameters** - The C-syntax for the TecUtil functions includes both inputs and outputs in the argument list. The Python/ syntax explicitly sets the "outs" from the C-syntax as the result(s) for the Python version of the function. The "ins" remain input parameters for the Python version of the function.

  Given the following C-syntax:

```
TecUtilMyFunction(int var1,
                                  int var2,
                                  int var3,  /*OUT*/
                                  int var4); /*OUT*/
```

The Python equivalent is:

```
Results=TecUtil.MyFunction(var1, var2)
```

where:

```
            int          var1
            int          var2
            tuple        Results
                         int Results[0] var3
                         int Results[1]var4
```

Refer to the following sections for additional syntax rules, limitations and exceptions.

16 - 3 Input Types

Variables in Python are not typed as they are in C. Instead, all variables are effectively pointers to Python objects. When working with TecUtil functions, note that the variables will not be cast to the type shown in the ADK Reference Manual, but will be equivalent to the Python built-in type, as described in the following table:

C Type	Python built-in type
Boolean_t, bool	Boolean
int, short, char (not char *), SetIndex_t, ColorIndex_t, EntIndex_t, SmInteger_t, LgIndex_t, NodeMap_t, Strand_t, FaceNodeOffset_t, ElemFaceOffset_t, FaceBndryItemOffset_t	Integer
long, UniqueID_t, GeomID, Text_ID, Int64_t, UInt64_t, FileOffset_t, MemMapOffset_t	Long integer (unlimited size)
float, double	Float
char *	String

Refer to the following sections for additional information on variable types in Python:

- String Lists
- Sets
- NULL Pointers
- Sequences
- ArgList_pa Types

- Input Parameters With Mixed Types
- Opaque Types

16 - 3.1 String Lists

If a variable is of the type String_pa, perform the following steps for the Python syntax:

1. Declare a list:

```
mylist=[“val1”, “val2”, ..., “valn”]
```

2. In the function prototype, use mylist in lieu of the StringList_pa variable.

For example, given the following C-syntax:

```
TecUtilMyFunction ( Boolean IsTrue,
                                    StringList_pa VarList)
```

The equivalent Python syntax is:

```
mylist=[“val1”, “val2”, ..., “valn”]
TecUtil.MyFunction(IsTrue, mylist)
```

where:

```
boolean             IsTrue
list                mylist
```

16 - 3.2 Sets

If a variable is of the type Set_pa, perform the following steps for the Python syntax:

1. Declare a list or tuple:

```
mylist=[6,13,15]
```

or

```
nine=9.0
mytuple  = (0, 1, 4, 9, 16, 25)
```

2. In the function prototype, use mylist or mytuple in lieu of the Set_pa variable.

For example, given the following C-syntax:

```
TecUtilMyFunction ( Boolean IsTrue,
                                    Set_pa  VarSet)
```

The equivalent Python syntax is:

```
mylist=[1, 4, 9]
TecUtil.MyFunction(IsTrue, mylist)
```

where:

```
boolean             IsTrue
list                mylist
```

or

```
nine=9.0
```

```
mytuple  = (0, 1, 4, 9, 16, 25)
TecUtil.MyFunction(IsTrue, mytuple)
```

where:

```
boolean             IsTrue
tuple               mytuple
```

16 - 3.3 NULL Pointers

Use the None object in your Python code wherever a NULL pointer would have been passed in C code. For example:

```
success=TecUtil.LineMapSetAssignment(TecVals.SV_Zone, None, 0, 2)
```

16 - 3.4 Sequences

Arrays of values in Python are defined as either a list or a tuple. TecUtil functions support both forms of input arrays. Square brackets are used to denote lists and parentheses are used to denote tuples. Consider the following examples:

```
four = 4
nine = 9.0
xVals  = [0, 1.0, 2, 3.0, 4, 5]    # Okay to mix integers and doubles
yVals  = (0, 1, four, nine, 16, 25)# This tuple references other
                                   # objects (four and nine).
numPoints = len(xVals)
success = TecUtil.CreateSimpleZone(numPoints, xVals, yVals,
                                    TecVals.FieldDataType_Double)
```

Note that some of the values being passed to CreateSimpleZone are integers, even though the function expects doubles. This is acceptable - the values will be promoted to the expected type within the TecUtil glue function.

Also note that while lists and tuples in Python can point to objects of different types, including other lists, not all mixtures are acceptable to Tecplot 360. For example, you cannot input strings or references to another list in a function that expects doubles.

16 - 3.5 ArgList_pa Types

ArgList_pa types are used in TecUtil functions that end with the letter X. TecUtil functions that end in the letter X (i.e. TecUtil*X) are TecUtil functions that require a flexible, or extended, argument list or a varied number of arguments. Where appropriate, a standard argument list function is provided along with the extended version so that common uses of the function are not burdened with the additional instructions required for the extended version.

The ArgList_pa type maps nicely to a Python dictionary native type. Dictionaries are lists of key value pairs.

The following code snippet illustrates how this might be used in a call to TecUtilStyleSetLowLevelX. Note: For brevity, we have omitted creation of the zoneSet variable.

The C code:

```
ArgList_pa arglist1 = TecUtilArgListAlloc();
TecUtilArgListAppendString(arglist1, SV_P1, SV_FIELDMAP);
TecUtilArgListAppendString(arglist1, SV_P2, SV_EDGELAYER);
TecUtilArgListAppendString(arglist1, SV_P3, SV_COLOR);
TecUtilArgListAppendSet(arglist1, SV_OBJECTSET, zoneSet);
TecUtilArgListAppendArbParam(arglist1, SV_IVALUE, (ArbParam_t) Blue_C);
TecUtilStyleSetLowLevelX(arglist1);
```

```
TecUtilArgListDealloc(&argList1);:
```

The equivalent code in Python:

```
argList = dict()
argList[TecVals.SV_P1] = (TecVals.AppendString, TecVals.SV_FIELDMAP)
argList[TecVals.SV_P2] = (TecVals.AppendString, TecVals.SV_EDGELAYER)
argList[TecVals.SV_P3] = (TecVals.AppendString, TecVals.SV_COLOR)
argList[TecVals.SV_OBJECTSET] = (TecVals.AppendSet, [2])
argList[TecVals.SV_IVALUE] = (TecVals.AppendArbParam, TecVals.Blue_C)
TecUtil.StyleSetLowLevelX(argList)
```

Note that the name string (second parameter in the C version of the TecUtilArgListAppend* functions) becomes the key string in the Python dictionary.

The value portion of the dictionary must be a tuple. The first item in the tuple identifies the type of data using constants found in the TecVals module. The type identifiers correspond to the ArgListAppend* function that you would normally call in C:

```
TecVals.AppendArbParam
TecVals.AppendInt
TecVals.AppendDouble
TecVals.AppendSet
TecVals.AppendStringList
TecVals.AppendArray
```

The second item in the value tuple holds the actual data (what is usually the third parameter in the C version of the TecUtilArgListAppend* function). When the data are in the form of a Set, StringList, or Array, then again the native Python lists can be used.

Any TecUtil*X function that requires a parameter that is a pointer is not supported by the Python interpreter.

16 - 3.6 Input Parameters With Mixed Types

In the ADK, ArbParam_t is used to cast input parameters when the data being passed may take different forms (integer, double, list, etc.).

When an input parameter is an ArbParam_t in the C syntax, the ADK Reference Manual will indicate the type of data actually expected (usually depending on other input parameters). In the Python call, simply use the appropriate built-in type (see also: Section 16 - 3 “Input Types”).

For example, when calling TecUtilStateChanged for Zones Added, the ArbParam_t parameter references a Set_pa. Since Set_pa maps to a Python list, the call would simply be:

```
TecUtil.StateChanged(TecVals.StateChange_ZonesAdded, [1,2,3])
```

16 - 3.7 Opaque Types

Some functions return a pointer to an "opaque" type. These are references that cannot be manipulated in the Python code - they are used only as input parameters for subsequent calls to other TecUtil functions. In these cases, you do not need to be concerned with the data type that is returned. Simply assign the return object to a variable and pass that variable back into the functions that need it.

For example:

```
textId = TecUtil.TextCreate(TecVals.CoordSys_Frame, 50, 50,
                                  TecVals.Units_Frame, 3.5, "Hello
World")
TecUtil.TextSetFont(textId, TecVals.Font_Helvetica)
```

Opaque types include:

```
Menu_pa
AddOn_pa
NodeMap_pa
FaceNeighbor_pa
FaceMap_pa
ElemToFaceMap_pa
FieldData_pa
AuxData_pa
ViewState_pa
UniqueID_t
Geom_ID
Text_ID
```

16 - 4 Output Types

Most TecUtil functions that send data or set styles return a single value or none at all. In general, these map to the Python boolean or integer types shown in Section 16 - 3 “Input Types”. All successful calls to the TecUtil functions return an object pointer. In the case where the C version of the TecUtil function is void, the return in Python points to a special "NONE" object. See also: Section 16 - 3.3 “NULL Pointers”.

16 - 4.1 Output Parameters

Because of the way data are handled in Python, most objects are immutable. Arguments to functions are typically passed by value and not by reference. Lists are the primary exception to this rule.

For example, consider the following C code:

```
double xPos;
double yPos;
double height;
double width;
TecUtilFrameGetPosAndSize(&xPos, &yPos, &width, &height);
```

Python will not allow us to declare a variable without an assignment. It also does not have an equivalent to the & (address of) operator in C.

When the C version of a TecUtil function includes output parameters, they are not included in the argument list. The desired values are packed into a tuple which becomes return value.

```
returnVals = TecUtil.FrameGetPosAndSize()
print 'X pos is ', returnVals[0]
print 'height is ',  returnVals[3]
```

Note that the function call did not include any arguments, since all the parameters in this function were output values. If the C function included both input and output parameters, only the input values would be included in the argument list. The output values would be in the returned tuple in the same order that they appeared in the original function:

```
# CSyntax is "void  TecUtilTextGetAnchorPos(Text_ID textId, double *
xPos, double * yPos, double * zPos)"

returnVals = TecUtil.TextGetAnchorPos(textId)# only the Text_ID value
is included in the arguments
print 'X Pos is', returnVals[0]
print 'Y Pos is', returnVals[1]
```

In this example, the original function is void so the return parameters begin at the first item in the tuple (index 0). If the function had both a return value and output parameters, then the return value would be in index 0 and the output parameters would begin at index 1.

16 - 4.2 Reference Counts

ALL returns from TecUtil functions are new references. The Python code is therefore the "owner" of these objects, and is responsible for performing DECREFs (decrement the reference count) when the objects are no longer needed.

16 - 5 Exceptions to the Rules

A small number of functions use slight variations to the rules shown above.

- ViewDealloc
- The C syntax indicates that the "address of" (&) operator be prepended to the variable name. Since this is not a valid Python operator, the opaque pointer is passed in as is.
- ContourGetLevels

  The list of levels is returned as the third item in the return tuple. In Python, do not call TecUtilArrayDealloc as noted in the instructions, although the return tuple should be de-referenced when it is no longer needed.

16 - 6 Convenience Functions

Tecplot 360's Python interpreter includes a small library of convenience functions for reading and writing data. The following functions are provided:

- ZoneGetDimensions
- IOrderedDataValuesGet
- IOrderedDataValuesSet
- IJOrderedDataValuesGet
- IJOrderedDataValuesSet
- IJKOrderedDataValuesGet
- IJKOrderedDataValuesSet

16 - 6.1 ZoneGetDimensions

`ZoneGetDimensions` is an abbreviated version of `ZoneGetInfo` that skips all the `FieldData_pa` returns. It has the following syntax:

```
dims = TecUtil.ZoneGetDimensions(zoneNum)
```

On return, dims will reference a tuple with the following values:

dims[0]	I-dimension for ordered data, or number of data points for FE data.
dims[1]	J-dimension for ordered data, or number of elements for FE data.
dims[2]	K-dimension for ordered data, or the number of nodes per cell for cell-based FE data (triangles, bricks, tetrahedra, and quadrilaterals), or the number of faces for face-based FE data (polygons and polyhedrons).

16 - 6.2 IOrderedDataValuesGet

The IOrderedDataValuesGet function reads data from the active frame in Tecplot 360. The data are returned in a list object in a 1-dimensional format. This function can be used whether the data in Tecplot 360 are XY, 2D, or 3D. The "IOrder" refers to the format of the returned list object, not the format of the data.

The function has the following syntax:

```
ptList = TecUtil.IOrderedDataValuesGet(zoneNum, varNum, start, end)
```

Variable	Type	Optional / Default / Return	Notes
zoneNum	Integer	Required	1-based value of the zone containing data to be read.
varNum	Integer	Required	1-based index of the variable to be read.
Start	Integer	Optional / 1	1-based index of the first point to be read. If not included, read will start at the first data point.
End	Integer	Optional / Last point	1-based index of the last point to be read (inclusive). If not specified, the read will go to the last data point.
ptList	List	Return object	New reference. List containing the requested values.

Note: if the 'start' value is set at 8, then ptList[0] contains the value for the eighth data point in the zone.

16 - 6.3 IOrderedDataValuesSet

The IOrderedDataValuesSet function updates data in the active frame in Tecplot 360. The zone and variable must already exist - this simply populates the values. The values are passed using a list object in a 1-dimensional format. This function can be used whether the data in Tecplot 360 are XY, 2D, or 3D, and ordered or FE data. The "IOrder" refers to the format of the input list object, not the format of the data in the frame.

The function has the following syntax:

```
returnVal = TecUtil.IOrderedDataValuesSet(zoneNum, varNum, ptList, start)
```

Variable	Type	Optional / Default / Return	Notes
zoneNum	Integer	Required	1-based value of the zone to be modified.
varNum	Integer	Required	1-based index of the variable to be modified.
ptList	List	Required	List containing the data values. Must be 1-dimensional (no references to other lists).
Start	Integer	Optional / 1	1-based index of the first point to be output. Points will be written to the end of the list or the end of the zone size, whichever comes first.
returnVal	None	Return object	

16 - 6.4 IJOrderedDataValuesGet

The IJOrderedDataValuesGet function reads data from the active frame in Tecplot 360. The frame must contain ordered data (not FE data). The values are returned in a list object in a 2-dimensional format (i.e. a list of lists).

The function has the following syntax:

```
ptList = TecUtil.IJOrderedDataValuesGet(zoneNum, varNum, startI, endI,
startJ, endJ)
```

Variable	Type	Optional / Default / Return	Notes
zoneNum	Integer	Required	1-based value of the zone containing data to be read.
varNum	Integer	Required	1-based index of the variable to be read.
startI	Integer	Optional / 1	1-based value for the starting I-index.
endI	Integer	Optional / Max data I dimension	1-based value of the last I-index (inclusive).
startJ	Integer	Optional / 1	1-based value of the first J-index.
endJ	Integer	Optional / Max data J dimension	1-based value of the last J-index.
ptList	List	Return object	New reference. 2-dimensional list containing the requested values.

16 - 6.5 IJOrderedDataValuesSet

The IJOrderedDataValuesSet function updates data in the active frame in Tecplot 360. The zone and variable must already exist - this simply populates the values. The values are passed using a list object in a 2-dimensional format (a list of J lists, each containing a list of I values). The data in the frame must be ordered data in at least 2 dimensions.

The function has the following syntax:

```
ptList = TecUtil.IJOrderedDataValuesSet(zoneNum, varNum, ptList,
startI, startJ)
```

Variable	Type	Optional / Default / Return	Notes
zoneNum	Integer	Required	1-based value of the zone containing data to be read.
varNum	Integer	Required	1-based index of the variable to be read.
ptList	List	Required	List containing the data values. Must be 2-dimensional (list of lists).
startI	Integer	Optional / 1	1-based value for the starting I-index.
startJ	Integer	Optional / 1	1-based value of the first J-index.
returnVal	None	Return object	

16 - 6.6 IJKOrderedDataValuesGet

The IJKOrderedDataValuesGet function reads data from the active frame in Tecplot 360. The frame must contain ordered data (not FE data). The values are returned in a list object in a 3-dimensional format.

The function has the following syntax:

```
ptList = TecUtil.IJKOrderedDataValuesGet(zoneNum, varNum, startI, endI,
startJ, endJ, startK, endK)
```

Variable	Type	Optional / Default / Return	Notes
zoneNum	Integer	Required	1-based value of the zone containing data to be read.
varNum	Integer	Required	1-based index of the variable to be read.
startI	Integer	Optional / 1	1-based value for the starting I-index.
endI	Integer	Optional / Max data I dimension	1-based value of the last I-index (inclusive).
startJ	Integer	Optional / 1	1-based value of the first J-index.
endJ	Integer	Optional / Max data J dimension	1-based value of the last J-index.
startK	Integer	Optional / 1	1-based value of the first K-index.
endK	Integer	Optional / Max data J dimension	1-based value of the last K-index.
ptList	List	Return object	New reference. 3-dimensional list containing KMax lists of JMax lists of IMax values.

16 - 6.7 IJKOrderedDataValuesSet

The IJKOrderedDataValuesSet function updates data in the active frame in Tecplot 360. The zone and variable must already exist - this simply populates the values. The values are passed using a list object in a 3-dimensional format (for each K there is a list of J lists, each containing a list of I values). The data in the frame must be ordered data in at least 3 dimensions.

The function has the following syntax:

```
ptList = TecUtil.IJOrderedDataValuesSet(zoneNum, varNum, ptList,
startI, startJ, startK)
```

Variable	Type	Optional / Default / Return	Notes
zoneNum	Integer	Required	1-based value of the zone containing data to be read.

varNum	Integer	Required	1-based index of the variable to be read.
ptList	List	Required	List containing the data values. Must be 3-dimensional lists.
startI	Integer	Optional / 1	1-based value for the starting I-index.
startJ	Integer	Optional / 1	1-based value of the first J-index.
startK	Integer	Optional / 1	1-based value of the first K-index.
returnVal	None	Return object	

16 - 7 Tecplot 360 Macro Commands for Python Modules

One of the best methods for working with Python scripts in Tecplot 360 is to combine the scripts with Tecplot 360 macro commands. Refer to Section 30 - 1 "Combining Python scripts with macro commands" in the User's Manual for details on this procedure. The syntax for the macro commands that work directly with the Python interpreter add-on is described below.

LOADPYFILE NAME

Description: Use this function to load a Python module via a macro file.

Syntax:

```
$!EXTENDEDCOMMAND
  COMMANDPROCESSORID = 'Python Utility'
  COMMAND = 'LOADPYFILE NAME="<string>"
```

Parameter	Type	Required	Notes
NAME	= "<string>"	Y	Name of Python module to load / reload. Do not include the path or extension. NOTE: the file must reside in a directory included in your PYTHONPATH definition. Refer to Section 15 - 2 "Installation and Setup" for details.

MODIFYPYPATH

Description: Use this command to temporarily modify your PYTHONPATH variable. The variable will be set for the duration of the Tecplot 360 session using the macro command/file.

Syntax:

```
$!EXTENDEDCOMMAND
  COMMANDPROCESSORID = 'Python Utility'
  COMMAND = 'MODIFYPYPATH FOLDER="<string>"
```

Parameter	Type	Required	Notes
FOLDER	= "<string>"	Y	Name of folder to be added to the Python search path.

RUNPYFUNCTION

Description: Use this command to execute a Python function via a macro file. NOTE: Before executing a Python function, you must first load the module that contains it via the LOADPYFILE NAME command.

Syntax:

```
$!EXTENDEDCOMMAND
  COMMANDPROCESSORID = 'Python Utility'
  COMMAND = 'RUNPYFUNCTION MODULE="<string>" FUNCTION="<string>"
                           ARGUMENTS="<arg1>, <arg2>, ..."'
```

Parameter	Type	Required	Notes
MODULE	= "<string>"	Y	Name of module containing the desired function (do not include path or extensions). NOTE: the module must already be loaded using the LOADPYFILE NAME command.
FUNCTION	= "<string>"	Y	Name of quick macro function to execute.
ARGUMENTS	= "<arg1>, <arg2>, ..."	Y, for any function that requires input parameters.	Input arguments for the Function, entered as comma separated values in a quoted string. The number of individual arguments and the argument types depend on function.

16 - 8 Notes for Novice Python Users

If you are new to Python scripting, please be aware of the following concepts:

- There are not any Python equivalents for TecUtil Alloc, Dealloc or manipulation functions. Use the built-in Python functions.
- The comment symbol in Python is "#".

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